

Physicians

for a Growing America

Report of the Surgeon General's
Consultant Group on Medical Education

Public Health Service



October 1959

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service Publication No. 709

UNITED STATES GOVERNMENT PRINTING OFFICE • WASHINGTON • 1959

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington 25, D.C. - Price 60 cents

The Surgeon General's
Consultant Group on Medical Education

FRANK BANE, CHAIRMAN
Former Executive Director
Council of State Governments

ROBERT C. ANDERSON, Ph. D.
Director
Southern Regional Education Board

FRED C. COLE, Ph. D.
President
Washington and Lee University

EDWIN L. CROSBY, M.D.
Director
American Hospital Association

WARD DARLEY, M.D.
Executive Director
Association of American Medical Colleges

HAROLD L. ENARSON, Ph. D.
Director
Western Interstate Commission for Higher
Education

ALVIN C. EURICH, Ph. D.
Vice President
The Fund for the Advancement of Education

HAROLD HILLENERAND, D.D.S.
Secretary
American Dental Association

NORVIN C. KIEFER, M.D.
Chief Medical Director
The Equitable Life Assurance Society of the
United States

VERNON W. LIPPARD, M.D.
Dean
Yale University School of Medicine

CLAYTON G. LOOSLI, M.D.
Dean
University of Southern California School
of Medicine

JOHN McK. MITCHELL, M.D.
Dean
University of Pennsylvania School of Medicine

EMORY W. MORRIS, D.D.S.
President
W. K. Kellogg Foundation

JULIAN P. PRICE, M.D.
Member, Board of Trustees
American Medical Association

I. S. RAVDIN, M.D.
Vice President for Medical Affairs and
Professor of Surgery
University of Pennsylvania

JOHN G. SEARLE
President
G. D. Searle & Co.

MARION W. SHEAHAN
Deputy General Director
National League for Nursing, Inc.

VERY REV. ROBERT J. SLAVIN, O.P., Ph. D.
President
Providence College

CHARLES B. SMITH, M.D.
Dean
School of Public Health
University of California

MORRIS THOMPSON, Sc. D.
President
Kirkville College of Osteopathy
and Surgery

EDWARD L. TURNER, M.D.
Director
Division of Scientific Activities
American Medical Association

DOUGLAS E. H. WILLIAMS
Executive Secretary
Dunbar Community Association, Inc.

Study Staff

WILLIAM H. STEWART, M.D.,
Chief
Division of Public Health Methods

MARION E. ALTENDERFER
MARJORIE GOOCH, Sc. D.

RUTH M. RAUP
MARGARET D. WEST

Leroy E. Burney, M.D.,
The Surgeon General
Public Health Service

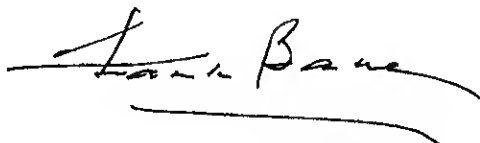
Dear Dr. Burney:

I am transmitting herewith the report "Physicians for a Growing America," prepared at your request by the Consultant Group on Medical Education to answer the question: "How shall the Nation be supplied with adequate numbers of well-qualified physicians?"

The Consultant Group considers the maintenance of the present ratio of physicians to population a minimum essential to protect the health of the people of the United States. To achieve this, the number of physicians graduated annually by schools of medicine and osteopathy must be increased from the present 7,400 a year to some 11,000 by 1975—an increase of 3,600 graduates.

To meet the country's need for physicians for medical care, teaching, research, and other essential purposes will require an immediate and strenuous program of action by the Nation as a whole. This program must safeguard and improve the quality of medical education as well as bring about the needed substantial increase in the number of physicians. The Consultant Group urges the Public Health Service to assist in every way possible in planning and implementing such a program.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Frank Bane", with a long horizontal flourish extending to the right.

FRANK BANE
Chairman

September 15, 1959

Contents

Introduction	Page xiii
<i>Chapter I. How Many Physicians Are Needed?</i>	1
Supply of Physicians	1
Increasing Need for Physicians	5
A Goal for 1975	12
Summary	13
<i>Chapter II. Supply of Students</i>	14
Number of Applicants	14
Quality of Students	15
Deterrents to Medical Education	16
Sources of Student Support	20
Outlook for the Future	24
Summary	24
<i>Chapter III. The Medical School</i>	26
History	26
Number, Location, and Size	27
Responsibilities and Functions	28
Curriculum	29
Faculty	30
Facilities and Administration	31
Budgets	35
Summary	35

<i>Chapter IV. Financing Medical Schools</i>	<i>Page</i> 37
School Expenditures.....	38
Support for Basic Operations.....	41
Grant-Supported Research.....	47
Medical School Construction.....	48
Summary.....	51
 <i>Chapter V. Planning the Expansion of Medical Education</i>	 52
Methods of Expansion.....	52
Location of New Medical Schools.....	54
Planning.....	54
Summary.....	56
 <i>Chapter VI. Summary and Recommendations</i>	 57
Support of Students.....	57
The Medical School.....	59
Financing Medical Education.....	61
Planning.....	64
Related Health Professions.....	65
 <i>Appendix A. Dentists for a Growing America</i>	 67
 <i>Appendix B. Development of New Medical Schools</i>	 71
 <i>Appendix C. Location of New Medical Schools</i>	 72
 <i>Appendix D. Tables</i>	 74
 References.....	 90

Tables

<i>Table Number</i>	<i>Page</i>
1. Physicians (M.D. and D.O.) in the United States: 1930-59.....	2
2. Estimated number of physicians (M.D. and D.O.) in the United States and graduates at present production rates, at recent growth rates, and to maintain 1959 ratio: 1959-75.....	3
3. Total population of the United States including Armed Forces overseas, by age: 1930-50 and estimates 1960-75.....	5
4. Number and proportion of persons covered by hospital, surgical, and medical insurance: 1940-58.....	6
5. General and allied special hospital beds and utilization: 1931-57.....	7
6. Physicians (M.D.) in the United States, by type of practice: 1931-57.....	8
7. Interns and residents serving in hospitals approved for training by the American Medical Association and the American Osteopathic Association: 1930-57.....	9
8. Physicians (M.D. and D.O.) in the United States, by type of practice: 1957.....	10
9. Average MCAT scores, by percent of out-of-State students and medical school expenditures: 1958.....	16
10. Scholarship or fellowship support of medical students and graduate students in related fields, by percent of students supported and average amount per student.....	22
11. Control of principal teaching hospitals of public and private 4-year medical schools in the United States: 1959.....	33
12. Basic operating expenses (excluding grant-supported research) of all medical schools in the United States: 1941-58.....	41
13. Basic operating expenses (excluding grant-supported research) of 85 medical schools in the United States, by control of school: 1958.....	42
14. Construction of teaching hospitals at selected medical schools.....	49
15. Construction of teaching facilities at selected medical schools.....	50

Charts

	<i>Page</i>
Chart 1. Graduates in medicine and osteopathy: 1931-58.....	2
Chart 2. Physicians per 100,000 civilians in each State: 1957.....	4
Chart 3. Educational status of adults: 1940, 1957, and 1975 estimate.....	6
Chart 4. Physicians per 100,000 persons, by type of practice: 1931-57 and 1975.....	8
Chart 5. Family physician potential (M.D.) per 100,000 persons: 1931-57...	11
Chart 6. First-year students withdrawing from medical schools: 1955-58....	15
Chart 7. Medical graduates and Ph. D.'s: 1920-58 and estimates to 1970....	17
Chart 8. State residents in first-year classes of schools of medicine and osteopathy: 1958.....	17
Chart 9. Factors related to rate of enrollment of State residents in schools of medicine and osteopathy: 1958.....	18
Chart 10. Tuition and fees of medical schools: 1958.....	19
Chart 11. First-year students charged less than \$800 tuition, by residence: 1958.....	19
Chart 12. Location of schools of medicine and osteopathy: 1959.....	27
Chart 13. Graduates of public and private medical schools: 1930-65.....	28
Chart 14. Sources of financial support for medical schools: 1941-58.....	37
Chart 15. Sources of financial support for each of 78 4-year medical schools: 1958.....	39
Chart 16. Sources of financial support for each of 36 public and 42 private 4-year medical schools: 1958.....	40
Chart 17. State and local governmental support of medical education per \$1,000 personal income: 1958.....	43

Appendix Tables

<i>Table Number</i>	<i>Page</i>
1. First-year places in medical schools and colleges of osteopathy per 1,000 bachelor's degrees granted and balance of first-year places by State: 1958. . . .	74
1a. First-year places in medical schools and colleges of osteopathy needed in each State on basis of student potential: 1958 and 1970 estimate.	75
2. Active non-Federal physicians (M.D. and D.O.) per 100,000 civilian population: 1957 and 1970 estimate.	77
3. First-year places in medical schools and colleges of osteopathy in each State in relation to personal income: 1958 and 1970 estimate.	78
4. Number of active non-Federal physicians (M.D. and D.O.) and ratio to population, by division and State: 1957.	80
5. Non-Federal physicians (M.D.) per 100,000 civilian population, by division: 1931-57.	82
6. Number of physicians (M.D.) in the United States and ratio to population, by type of practice: 1931-57.	83
7. Family physician potential (M.D.) in the United States and ratio to population: 1931-57.	84
8. Medical schools, schools of basic medical sciences, and colleges of osteopathy in the United States: 1958.	85
9. Trend in enrollment, first-year students, and graduates of medical schools and colleges of osteopathy in the United States: 1940-59.	88
10. Graduates of public and private medical schools in the United States: 1931-58.	88
11. Expenditures for construction of medical schools and their affiliated institutions in the United States: 1948-59.	89

Introduction

Three major phenomena have combined to create a growing need for physicians the Nation. The first is the rapid growth of the population, with a more than proportionate increase in the younger and older age groups which need the most liberal service. The second is the increase in the individual use of medical services accompanying improvements in living standards, increased urbanization, more education, widespread use of health insurance, and advances in medical knowledge. The third is the increase in number of physicians required for specialized services, such as research and teaching.

The Surgeon General of the Public Health Service, in recognition of these needs, established late in 1958 a Consultant Group on Medical Education, to whom he posed the question: "How shall the Nation be supplied with adequate numbers of well-qualified physicians?"

To answer this question the Consultants considered first the Nation's current supply of physicians and the annual number of medical school graduates. In the United States (48 States and District of Columbia)¹ in 1959 there are some 235,000 doctors of medicine and 14,000 doctors of osteopathy for a population of 177 million people, or 141 physicians per 100,000. In 1959 there were 6,900 graduates of schools of medicine and 470 graduates of schools of osteopathy in the United States. The present plans of present and developing schools indicate that the total output will increase from this 7,400 to about 7,900 by 1965. This would not be adequate to maintain the current ratio of physicians to population. To maintain this ratio would require, by 1975, an annual 11,000 graduates, 3,600 more than were graduated in 1959.

If the current ratio represents a minimum adequate supply, and the Consultant Group's consensus is that this is the case, then the recent rate of growth of medical schools will not provide the Nation with adequate numbers of physicians. Expansion of existing schools and the establishment of new schools therefore must be greatly accelerated.

An additional problem is that presented by the serious underfinancing of approximately 15 percent of the present schools. While these schools meet the requirements of accreditation, accreditation in itself establishes only minimal standards of acceptability. As knowledge in the medical field has expanded in breadth and depth, the desirable medical education has moved farther away from the minimal standard. Continued underfinancing can only lead to further deviation from the desirable standards of medical education.

Expansion of the output of physicians will require a substantial increase in the supply of well-qualified students. Foremost among the factors that may prevent increased enrollment of qualified students in medical schools are the growing number and variety of competing professional opportunities, the high cost of medical education both in dollars and time, and the lack of financial assistance available to medical students as compared with assistance available for education in related scientific fields.

The United States has today 85 schools of medicine and 6 schools of osteopathy. The distribution and characteristics of these schools, including the broad areas of curriculum, faculty, facilities, and financing, are summarized in these pages to give a perspective of the resources available now for the education of physicians.

Regions of the United States which need medical schools most are those with inadequate medical educational opportunity for their young people and few physicians in relation to population. The needs of these areas must be weighed against their ability to give adequate support to new medical schools. The Consultant Group has discussed these and some of the other considerations which must be taken into account in planning the location of new facilities.

Recommendations based on the findings of the Consultants are contained in a final chapter. They include proposals for expanding the number of medical school graduates, as well as suggestions for enhancing the quality of medical education. Without an adequate number of well-qualified medical graduates, it will not be possible to translate the promise of medical research into the reality of good medical care for this country. The problem of increasing the supply of medical graduates is urgent.

¹ Alaska and Hawaii were not included because the necessary data were not available.

Chapter I

How Many Physicians Are Needed?

In the United States today the population is growing at a greatly accelerated rate, with the growth proportionately greater in the younger and older age groups: the two groups which require the greatest amounts of medical services. Although the medical schools have increased their capacity to educate physicians, the increase in the supply is not keeping up with the population growth.

In addition, the utilization of physicians' services is increasing and will continue to increase not only in the provision of patient care but also in research, teaching, public health, industrial medicine, and other essential activities.

Thus the problem of the growing need for physicians for this country stems from a combination of three major phenomena: the rapid growth of the population; the increase in the use of personal medical services; and the increase in the number of physicians required for specialized services.

For the layman the problem is evident. "What do the people, the 'consumers' of medicine, want

now? They want more of the doctor's time! It is their one . . . important complaint: Doctors are too busy . . . we'd like to talk more, to tell them more; we'd like them to explain more; to listen more" (1).

Dr. D. B. Allman, then president of the American Medical Association, pointed out in 1958: "Changes affecting every aspect of human life are occurring at an ever accelerating rate. . . . They have presented new problems and challenges to medicine and its allies as well as to other areas of activity. . . . It is not surprising that, with the current widespread interest in health, this changing scene has been accompanied by representation from various sources of increased needs for medical and allied personnel. No one will deny that, as our population grows at a rate far beyond estimates of a few decades ago, as health consciousness continues to grow, and as new problems arise, there will be continuing need for increased numbers of well trained medical personnel. This will necessitate the facilities, finances, and faculty essential to their education and training" (2).

SUPPLY OF PHYSICIANS

In 1930 the United States had 154,000 doctors of medicine and 10,000 doctors of osteopathy, or 134 physicians (doctors of medicine and osteopathy) for each 100,000 of the population. During the next 2 decades, the supply of physicians increased at a faster rate than did the population, so that by 1949 the number of doctors of medicine had risen to slightly more than 200,000 and doctors of osteopathy to 13,000, bringing the ratio of all physicians to population to 143. Since 1949, how-

ever, the population has increased faster than the supply of physicians, so that the overall supply of physicians is now slightly less relative to population than it was 10 years ago (table 1).

The supply of physicians at any given time depends primarily on the number of students graduated. In 1959 the medical schools in the United States graduated some 6,900 students, and the schools of osteopathy 470.

Table 1. Physicians (M.D. and D.O.)¹ in the United States: 1930-59

Year, July 1	Population (1,000's)	DOCTORS OF MEDICINE		DOCTORS OF OSTEOPATHY	
		Number	Rate per 100,000 population	Number	Rate per 100,000 population
1930.....	123,100	154,600	125.4	10,300	8
1940.....	132,122	175,200	132.6	12,400	9
1949.....	149,188	201,300	134.9	12,700	8
1957.....	171,196	226,600	132.4	13,700	8
1959 (est.).....	177,128	235,000	132.7	14,100	8

¹ Statistics on the number of physicians usually include doctors of medicine only. Data are shown in this report for both doctors of medicine and doctors of osteopathy wherever available. For comparative purposes data on each group are shown separately.

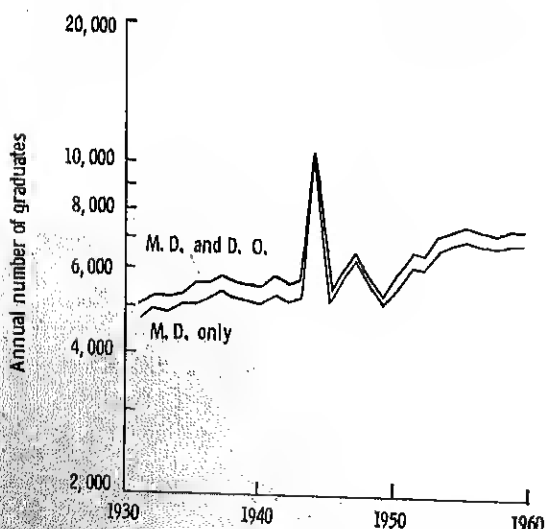
Source: Reference (3). Population includes Armed Forces overseas. Number of physicians 1930 estimated from 1931 data.

The Association of American Medical Colleges has estimated that there will soon be 7,400 graduates of medical schools annually (3). A conservative estimate for osteopathic graduates is 500 a year. If it is assumed that the number of foreign graduates who are licensed to enter practice in this country will level out at 750 a year (a conservative estimate based on the experience of the

past 10 years), a minimum estimate for the supply of doctors of medicine and of osteopathy in 1975 is 312,800 (table 2).

In the last 30 years, the number of graduates has risen fairly steadily (chart 1). Part of the growth was due to the expansion of existing schools and part to the development of 10 new schools. If the expansion rate of these years should continue until 1975, we would then be graduating 9,000 new physicians a year. If we should also continue to add 750 foreign graduates each year, our number of physicians would be 318,400 by 1975. But if we are to maintain a ratio of 141 physicians per 100,000 population this will not suffice. By 1975 we will need 330,000 physicians and an annual graduation rate of 11,000—3,600 more than the present 7,400 (table 2).

Chart 1. Graduates in medicine and osteopathy: 1931-58



Note: In 1944, 2 classes were graduated, due to the wartime accelerated program, which produced 4 classes in 3 years. Plotted on logarithmic scale to show rate of growth.

Source: Reference (3).

PHYSICIANS EDUCATED IN OTHER COUNTRIES

Many of the physicians practicing in the United States have been educated in other countries. In 1958 a total of 7,809 physicians were licensed to practice for the first time in the United States. Of this number, about 150 were graduates of Canadian schools and 1,166 were graduates of other foreign schools (4). The foreign school graduates included an estimated 400 American citizens who had gone to other countries for their

medical education (3); the balance were nationals of other countries. Thus about 17 percent of the physicians who entered practice in 1958 received their medical education in countries other than the United States.

The number of foreign graduates admitted to practice in the United States has increased greatly in recent years. The extent of the increase since 1950 is shown below:

Year	New Licentiate graduated from medical schools outside the U.S.
1950.....	458
1951.....	600
1952.....	719
1953.....	835
1954.....	922
1955.....	1,057
1956.....	1,002
1957.....	1,164
1958.....	1,316

Source: Reference (4), plus 150 graduates of Canadian schools each year.

Many foreign nationals serve as interns and residents in American hospitals. Some of them are licensed to practice and so remain in this country; others return home upon completion of their training period. In 1951 there were 2,100 aliens serving in this country as interns and residents; by 1957 the number had risen to 6,700, and by 1959 some 8,400 physicians from 91 countries were serving in 846 U.S. hospitals (5, 6).

These figures raise the question of whether this country, with its wealth, should be dependent on other nations for a net inflow of physicians to serve our people, when there are so many urgent needs for medical service in other parts of the world. In no other field of education is there a situation in which the United States draws to the same extent on persons educated in other nations to maintain its high level of service.

DISTRIBUTION OF PHYSICIANS

The number of physicians in relation to population varies widely in different parts of the United States. The highest ratios are found in the Northeast and in the Pacific States, while the lowest ratios are found in the Southeast and in the Mountain States. Chart 2 shows the ratio of active physicians (exclusive of those in military and other Federal services) to the civilian population in each State.

In the past two decades, differences in physician-population ratios among the geographic divisions of the United States have changed little. New England, the Middle Atlantic, and the Pacific States have retained high ratios of physicians, while the South Central States have continued to show the lowest ratios. Of particular note are the declining ratios of the North Central States, and the 20-year rise for the New England and South Atlantic Divisions (appendix table 5).

Table 2. Estimated number of physicians (M.D. and D.O.) in the United States and graduates¹ at present production rates, at recent growth rates, and to maintain 1959 ratio: 1959-75

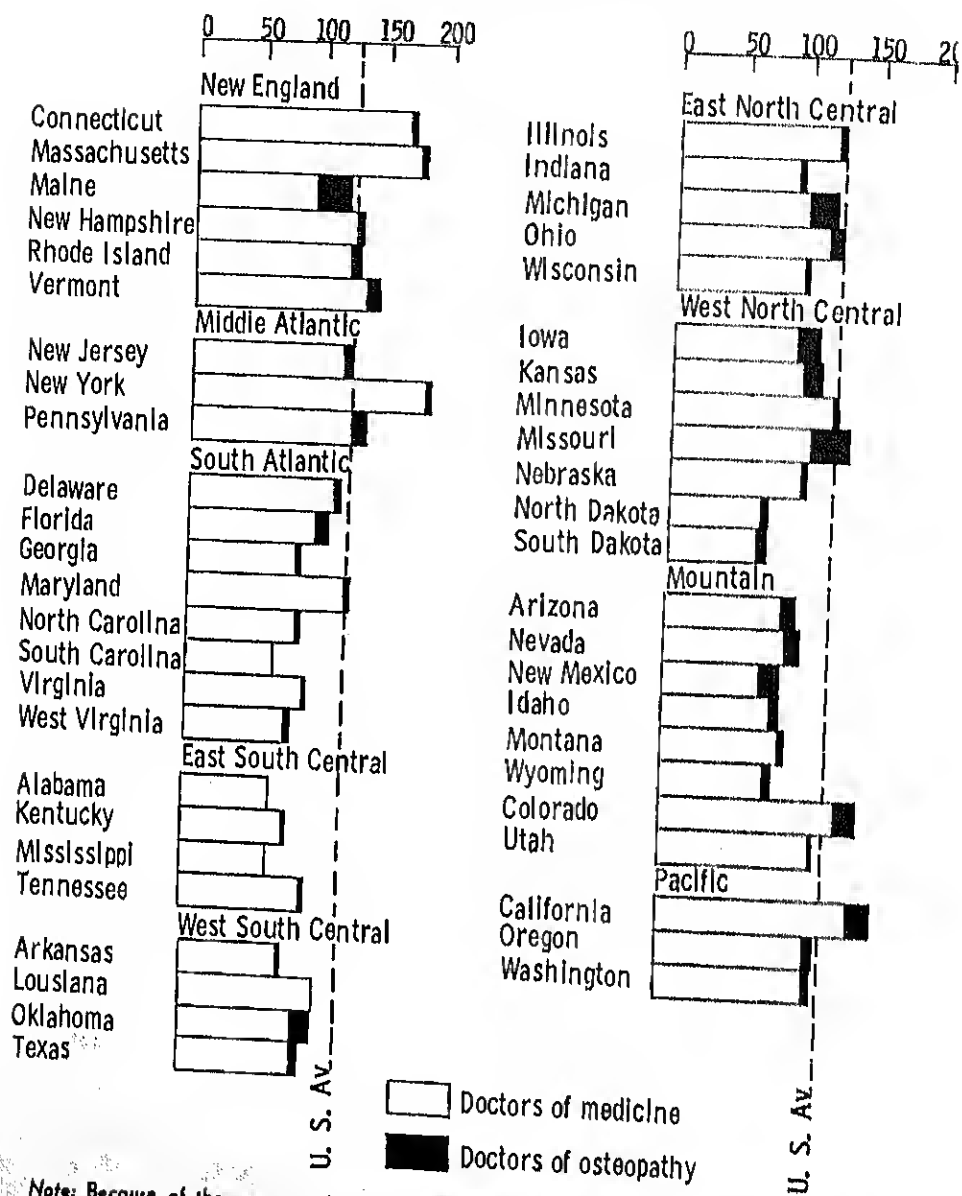
Year	PRESENT PRODUCTION RATE		RECENT GROWTH RATE ²		TO MAINTAIN 1959 RATIO	
	Graduates	Total physicians	Graduates	Total physicians	Graduates	Total physicians
1959.....	7,400	249,100	7,400	249,100	7,400	249,100
1960.....	7,500	253,400	7,500	253,400	7,500	253,400
1965.....	7,900	275,000	8,000	275,100	8,100	275,100
1970.....	7,900	294,900	8,500	296,500	9,600	299,000
1975.....	7,900	312,800	9,000	318,400	11,000	330,000

¹ See text for discussion of assumptions.

² Growth at average rate of past 30 years.

Source: Data at present production rate and at rate to maintain 1959 ratio are from reference (3), adjusted for osteopaths. Data at recent growth rate are estimated from data for present rate.

Chart 2. Physicians per 100,000 civilians in each State: 1957



Note: Because of the concentration in certain States of retired physicians and those in Federal service, the State ratios are exclusive of these 2 groups.
 Source: Appendix table 4.

INCREASING NEED FOR PHYSICIANS

The Nation's increasing need for physicians stems from a number of causes that are related to three major phenomena—population growth and change, increasing use of medical services, and changing patterns of service.

POPULATION GROWTH AND CHANGE

The population of the United States will reach 235 million by 1975—an increase of 55 million over the 1960 population—if present fertility and mortality patterns continue (table 3). This is an average increase of over 3.5 million people a year. The number of children under 15 is expected to increase by almost 20 million, an increase of nearly 35 percent. The number of people aged 65 and over will rise by 6 million, an increase of almost 40 percent in the 15-year period.

As people get older they tend to have more illness and more disability. The U.S. National Health Survey shows over twice as much disability for the ages 65 and over as for the younger ages.

Age	Number of days per person per year	
	Restricted activity	Bed disability
All ages.....	20	8
Under 5.....	13	6
5-24.....	15	7
25-64.....	20	7
65 and over.....	47	16

Source: Reference (8).

This added load of disability in the older population brings with it added demands for medical services. Children also require more physician care than do young and middle-aged adults. This is shown by the National Health Survey findings on physician visits and days of hospitalization:

Age	Physician visits per person per year	Annual hospital days per 100 persons
All ages.....	5.3	85.1
Under 5.....	6.4	47.9
5-24.....	4.2	46.3
25-64.....	5.4	103.7
65 and over.....	6.8	177.8

Source: References (8) and (9).

Table 3. Total population of the United States, including Armed Forces overseas, by age: 1930-50 and estimates 1960-75

(In thousands)

Year	All ages	Under 15	15-64	65 and over
1930.....	123,188	36,003	80,480	6,705
1940.....	132,122	32,942	90,150	9,031
1950.....	151,683	40,763	98,633	12,287
1960.....	180,126	56,367	107,980	15,779
1965.....	195,747	61,296	116,813	17,638
1970.....	213,810	67,172	127,089	19,549
1975.....	235,246	75,285	138,089	21,872

Source: Reference (7).

Table 4. Number and proportion of persons covered by hospital, surgical, and medical insurance: 1940-58

Year	Hospital		Surgical		Medical	
	Persons protected (1000's)	Percent of population	Persons protected (1000's)	Percent of population	Persons protected (1000's)	Percent of population
1940.....	12,312	9	5,350	4	3,000	2
1950.....	76,639	51	54,156	36	21,589	14
1958.....	123,038	72	111,435	65	75,395	44

Source: Reference (15).

Thus, not only the increase in total population but also the greater proportions of younger and older people will bring added requirements for medical care.

INCREASING USE OF MEDICAL SERVICES

Today people are getting more medical care than ever before. Thirty years ago, the average person saw a doctor two or three times a year; now the annual average is five visits (8, 10). These changes have occurred at all ages—young and old have shared in receiving more medical service.

There is every indication that the factors that are bringing about the wider use of medical services (such as improved economic and educational status, spread of urbanization, and the extension of hospital and medical care insurance) will continue to operate into the foreseeable future and that the demand for medical services will continue to grow.

Economic and educational status.—People with higher incomes are in a better position to seek and secure medical services than are those with low incomes. Moreover, people with higher educational attainment tend to have a greater appreciation and understanding of the value of medical services. The U.S. National Health Survey (11) and other studies have found a direct relationship between economic status, educational level, and the receipt of medical care. While the relative contribution of each of these factors is a matter

of conjecture, it seems apparent that each is important.

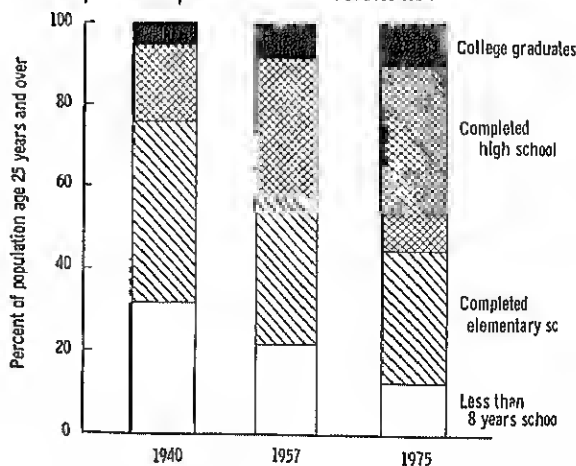
The past 30 years have seen substantial increases in average family income—with more money in the family budget for health and medical services. The present outlook is for a further substantial increase in the average family's purchasing power, with even more funds available for health services.

Year	Average family income after taxes	
	Current dollars	1957 dollars
1929.....	\$2,320	\$3,910
1957.....	5,480	5,480
1975.....		7,300

Source: References (12) and (13).

In 1940 only 25 percent of the adults in the United States had finished high school; by 1975

Chart 3. Educational status of adults: 1940, 1957, and 1975 estimate



Source: Reference (14).

over half of the adult population will have achieved that educational level (chart 3).

Thus both improved economic status and increasing educational achievement can be expected to increase the utilization of medical services.

Urbanization.—People in cities see doctors more often than do those who live in rural areas. In 1930 the urban population averaged 2.7 doctor visits a year; rural people, 2.1 (10). In 1958 the urban population averaged 5.6 physician visits, and the rural, 4.8 (8). The difference although not as marked as in the earlier year is still considerable. The proportion of people living in urban areas has increased to about two-thirds of the population and is expected to increase further. Continuing urbanization can be expected to add to the pressures for more medical care.

Hospital and medical care insurance.—In 1930 hospital and health insurance were virtually unknown. By 1940, hospital insurance of some sort was held by 1 person in 10 (table 4). The Blue Cross program had begun, and surgical and medical coverage were becoming available. Today almost three-fourths of the population has hospitalization insurance, two-thirds has surgical coverage, and medical coverage, including major medical insurance, is increasing. Exploration of ways of providing coverage for old people and other largely uncovered groups is an active concern at the present time.

CHANGING PATTERNS OF SERVICE

Very substantial changes have occurred in patterns of medical service in recent years—notably the growth in hospital utilization, new types of medical services, and specialization. The result has been that the proportion of physicians engaged in the private practice of medicine has decreased from 86 percent in 1931 to 69 percent in 1957. The proportion serving as family physicians has declined over this same period from 75 percent to 45 percent (appendix table 7).

Hospital utilization.—An important factor in the pattern of medical service has been the tremendous increase in the number of hospital beds in the United States and the increased utilization of hospital service. Since 1930 the number of beds in general and allied special hospitals has increased more than 70 percent (table 5). In relation to population these beds have risen from 3.7 to 4.6 per 1,000 persons.

With the increased availability of facilities has come a great increase in hospital use. Since 1930 the hospital admission rate has increased by 135 percent, and the average days of hospitalization by 47 percent.

There are many reasons for the growing use of hospital services. The superior facilities and equipment of the hospital permit better care of many patients. The use of insurance and prepayment devices has been noted. But also of great

Table 5. General and allied special hospital beds and utilization: 1931-57

Year	General hospital beds		Rate per 1,000 population	
	Number	Rate per 1,000 population	Admissions to general hospitals	General hospital days
1931	452,000	3.7	56	860
1940	527,000	4.0	74	1,019
1950	659,000	4.4	110	1,165
1957	779,000	4.6	132	1,264

Source: Reference (16).

Table 4. Number and proportion of persons covered by hospital, surgical, and medical insurance: 1940-58

Year	Hospital		Surgical		Medical	
	Persons protected (1000's)	Percent of population	Persons protected (1000's)	Percent of population	Persons protected (1000's)	Percent of population
1940.....	12,312	9	5,350	4	3,000	2
1950.....	76,639	51	54,156	36	21,589	14
1958.....	123,038	72	111,435	65	75,395	44

Source: Reference (15).

Thus, not only the increase in total population but also the greater proportions of younger and older people will bring added requirements for medical care.

INCREASING USE OF MEDICAL SERVICES

Today people are getting more medical care than ever before. Thirty years ago, the average person saw a doctor two or three times a year; now the annual average is five visits (8, 10). These changes have occurred at all ages—young and old have shared in receiving more medical service.

There is every indication that the factors that are bringing about the wider use of medical services (such as improved economic and educational status, spread of urbanization, and the extension of hospital and medical care insurance) will continue to operate into the foreseeable future and that the demand for medical services will continue to grow.

Economic and educational status.—People with higher incomes are in a better position to seek and secure medical services than are those with low incomes. Moreover, people with higher educational attainment tend to have a greater appreciation and understanding of the value of medical services. The U.S. National Health Survey (11) and other studies have found a direct relationship between economic status, educational level, and the receipt of medical care. While the relative contribution of each of these factors is a matter

of conjecture, it seems apparent that each is important.

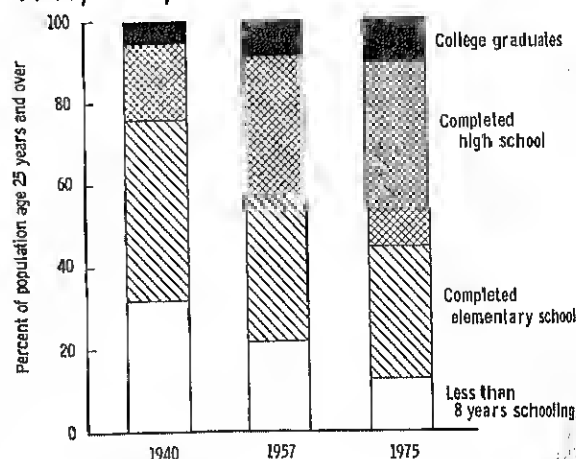
The past 30 years have seen substantial increases in average family income—with more money in the family budget for health and medical services. The present outlook is for a further substantial increase in the average family's purchasing power, with even more funds available for health services.

Year	Average family income after taxes	
	Current dollars	1957 dollars
1929.....	\$2,320	\$3,910
1957.....	5,480	5,480
1975.....		7,300

Source: References (12) and (13).

In 1940 only 25 percent of the adults in the United States had finished high school; by 1975

Chart 3. Educational status of adults: 1940, 1957, and 1975 estimate



Source: Reference (14).

over half of the adult population will have achieved that educational level (chart 3).

Thus both improved economic status and increasing educational achievement can be expected to increase the utilization of medical services.

Urbanization.—People in cities see doctors more often than do those who live in rural areas. In 1930 the urban population averaged 2.7 doctor visits a year; rural people, 2.1 (10). In 1958 the urban population averaged 5.6 physician visits, and the rural, 4.8 (8). The difference although not as marked as in the earlier year is still considerable. The proportion of people living in urban areas has increased to about two-thirds of the population and is expected to increase further. Continuing urbanization can be expected to add to the pressures for more medical care.

Hospital and medical care insurance.—In 1930 hospital and health insurance were virtually unknown. By 1940, hospital insurance of some sort was held by 1 person in 10 (table 4). The Blue Cross program had begun, and surgical and medical coverage were becoming available. Today almost three-fourths of the population has hospitalization insurance, two-thirds has surgical coverage, and medical coverage, including major medical insurance, is increasing. Exploration of ways of providing coverage for old people and other largely uncovered groups is an active concern at the present time.

CHANGING PATTERNS OF SERVICE

Very substantial changes have occurred in patterns of medical service in recent years—notably the growth in hospital utilization, new types of medical services, and specialization. The result has been that the proportion of physicians engaged in the private practice of medicine has decreased from 86 percent in 1931 to 69 percent in 1957. The proportion serving as family physicians has declined over this same period from 75 percent to 45 percent (appendix table 7).

Hospital utilization.—An important factor in the pattern of medical service has been the tremendous increase in the number of hospital beds in the United States and the increased utilization of hospital service. Since 1930 the number of beds in general and allied special hospitals has increased more than 70 percent (table 5). In relation to population these beds have risen from 3.7 to 4.6 per 1,000 persons.

With the increased availability of facilities has come a great increase in hospital use. Since 1930 the hospital admission rate has increased by 135 percent, and the average days of hospitalization by 47 percent.

There are many reasons for the growing use of hospital services. The superior facilities and equipment of the hospital permit better care of many patients. The use of insurance and prepayment devices has been noted. But also of great

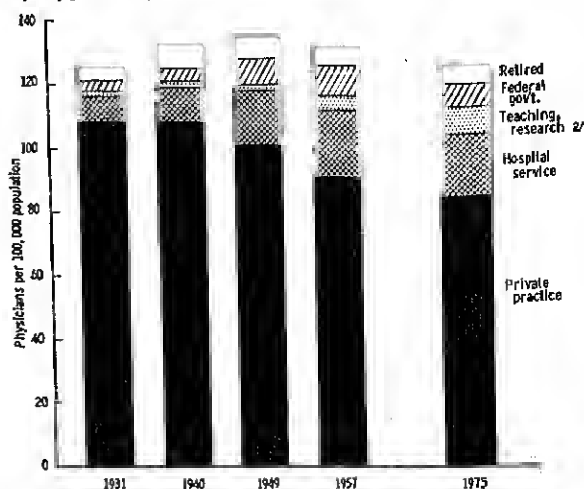
importance are the social considerations, such as the lack of home space and facilities, and the change in family composition which mean that family nursing care is decreasingly available. Moreover, hospitalization of his patients conserves the time of the practicing physician. As demands for physician services have increased, home visits have dropped off and both office and hospital visits have increased. In 1930, 44 percent of the average doctor's visits were to the home, today only 10 percent (8, 10).

Growth of new types of service.—A major change in medical service has been the increased employment of physicians in hospital service, teaching, research, industry, administration, and other types of institutional practice. These developments have made possible much of the progress of modern medicine. They have also been associated with a complementary reduction in the proportion of physicians in private practice.

In the past quarter century the Nation's population has increased by more than a third. In these years the number of physicians in hospital service, teaching, research, and other nonprivate practice has increased by more than 200 percent, while the number in private practice has increased by only 16 percent (table 6).

(1) *In private practice.*—The ratio of physicians in private practice to population has dropped from 108 per 100,000 in 1931 to 91 per 100,000 today. If present trends continue, the ratio of physicians in private practice will drop to about 85 per 100,000 by 1975. These changes are illustrated in chart 4.

Chart 4. Physicians per 100,000 persons, by type of practice: 1931-57 and 1975¹



¹ At present rate of graduation.

² Includes also non-Federal public health, industrial and insurance medicine, and other nonprivate practice.

Source: Appendix table 6 and estimates by Division of Public Health Methods.

(2) *In hospital service.*—The tremendous increase in hospital house staffs and other full-time hospital positions has dramatically changed the picture of medical supply and service. In 1930, 1 physician in 16 was serving full time in hospitals, now 1 in 6 (including interns and residents).

In 1930 there were about 7,000 interns and residents; by 1957 there were 36,000 (table 7). As has been noted earlier, about 6,700 of these were graduates of foreign schools.

Thirty years ago most young medical graduates went into practice after a year of internship. Increased specialization and emphasis on board certification for specialty practice now mean that

Table 6. Physicians (M.D.) in the United States, by type of practice: 1931-57

Year	Total	Private practice	Hospital service	Teaching, research, and other	Retired
1931.....	156,406	134,274	9,700	6,451	5,981
1940.....	175,163	142,939	14,209	8,142	9,873
1949.....	201,277	150,417	24,887	16,273	9,700
1957.....	226,625	155,827	36,371	23,766	10,661

Source: Appendix table 6.

Table 7. Interns and residents serving in hospitals approved for training by the American Medical Association and the American Osteopathic Association: 1930-57

Year	In hospitals approved by American Medical Association		In hospitals approved by American Osteopathic Association	
	Interns	Residents	Interns	Residents
1930.....	5,500 est.	1,500 est.	(1)	(1)
1940.....	7,553	3,900 est.	126	(1)
1950.....	6,821	14,595	307	83
1957.....	10,198	24,976	441	241

¹ Not available.

Source: References (17) and (18).

most young physicians want a period of residency training which will meet board requirements—a period of from 1 to 6 years after graduation. The average period of graduate work in the hospital is now 3.5 years (19).

Today the internship and residency are considered by medical educators primarily as educational experience. These house staff members do, however, give valuable service in caring for patients at many institutions. Twelve percent of all listed hospitals offer training for interns. These hospitals have 21 percent of the Nation's hospital beds (20). The corresponding figures for hospitals approved for residency training are 18 percent of the hospitals and 47 percent of the beds (20). The place of the house staff in the provision of medical care has been given surprisingly little study, in view of the fact that over 10 percent of the physicians in the United States are serving as interns or residents.¹

Although many physicians are serving in hospitals in full-time administrative and staff capacities, the number of such hospital physicians does not meet the need. Medical care for patients in mental and other long-term hospitals is a continuingly acute problem. Mental hospitals are notoriously understaffed. Many of them are able to give only minimal custodial care to patients who with more intensive care might be rehabilitated and restored to society. A recent study of the

American Psychiatric Association (21) showed that the public mental hospitals of the Nation needed 3,700 physicians to meet the minimum standards of the association. The public mental hospitals of 47 of the 48 States failed to meet these standards.

(3) *In teaching, research and other.*—The number of physicians engaged in full-time teaching, research, public health, industrial medicine, military service, and all other activities except private practice and hospital service, has almost quadrupled in the past 30 years. In 1931, 6,400 physicians so reported themselves; in 1957 the number was 23,800 (table 6). In addition, many others give part time to one or more of these activities. Still the need for service in these areas continues to grow.

Over 25,000 physicians are spending all or part of their time in *teaching or research*. Available data from studies of medical schools, the National Science Foundation, and the Public Health Service indicate that, together, the full- and part-time services of these physicians mean the equivalent of 15,000 full-time teachers and research workers. (Computed from 22, 23, and 24.) An increase in the number of medical schools, and strengthening the staffs of the present schools, would require considerable increases in faculty. Demands for physicians for research are growing rapidly and can be expected to continue to increase. The need for physicians for research, indeed, is one of the critical factors in the growth of medical research.

Data compiled for the 1958 National Conference on Public Health Training showed that *State and*

¹ On June 10, 1958, the W. K. Kellogg Foundation announced a grant to the AAMC to underwrite a study of the internship as it is presently operated in hospitals controlled by medical schools.

local health departments and other State health agencies employed a total of 2,300 physicians. These same agencies estimated that an additional 1,700 physicians would be needed by 1963 for adequate staffing (25).

The number of full- and part-time specialists in *industrial medicine*—an area in which needs are increasing rapidly—was 2,300 in 1957 (26). Many other physicians who do not report themselves as specialists in this field give part-time service to industry.

Some 10,000 physicians are in *military service* (26). It can only be assumed for the purpose of this discussion that such requirements will probably not be significantly reduced in the future.

Specialization.—A fundamental change in medical practice, and the one which has had the greatest impact on medical care, is the great growth of specialization. In 1931 only one private practitioner in six considered himself a specialist; by 1940, one in four. Today, almost half of all physicians in private practice limit themselves to

specialty practice (3). (This pattern is not nearly so pronounced for doctors of osteopathy as for doctors of medicine.) The types of practice of physicians in 1957 are shown in table 8.

For many people the function of family physician is now served by the specialist in internal medicine and the pediatrician. These two groups, with the general practitioner, make up the family physician potential today.² Even so, the number of potential family physicians has actually decreased, from 117,000 in 1931 to 102,000 in 1957 (appendix table 7). In relation to population, the decline is marked (chart 5).

In recognition of the need for good family physicians, a special committee of the American Medical Association has developed recommendations for a 2-year training program which students can enter immediately upon graduation from medical school. It will emphasize internal medicine, pediatrics, obstetrics, and minor surgery.

² Since many specialists in internal medicine and pediatrics serve only as consultants and specialists in such narrow fields as allergy, cardiovascular disease, etc., the number of potential family physicians is actually smaller.

Table 8. Physicians (M.D. and D.O.) in the United States, by type of practice: 1957

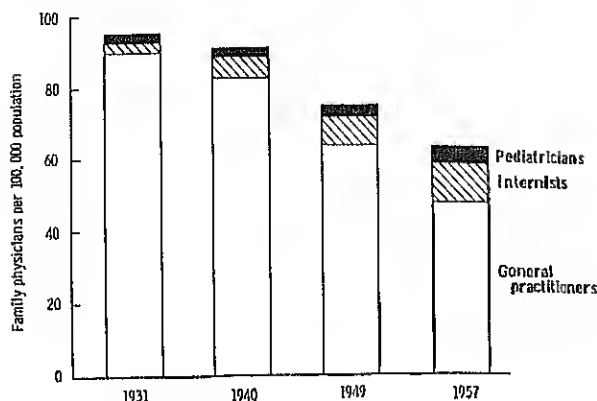
Type of practice	Doctors of medicine		Doctors of osteopathy	
	Number	Rate per 100,000 population	Number	Rate per 100,000 population
Total.....	226,625	132.4	13,692	8
Private practice.....	155,827	91.1	9,501	5
General practice and part-time specialty.....	81,443	47.6	8,656	5
Full-time specialty.....	74,384	43.5	845	()
Not in private practice.....	60,137	35.1	1,205	()
Hospital service (except Federal).....	36,371	21.2	872	()
Teaching, research, public health, other.....	7,168	4.2	321	()
Federal Government.....	16,598	9.7	12	(1)
Retired, not in practice.....	10,661	6.2	² 2,986	

¹ Less than 0.05.

² Includes 2,006 osteopathic physicians who did not report type of practice.

Source: Reference (3).

**Chart 5. Family physician potential
(M.D.) per 100,000 persons: 1931-57**



Source: Appendix table 7.

Factors affecting efficiency of medical practitioners.—Recent years have seen a significant increase in the efficiency of the physician, as measured both by what modern medicine has made possible, and by the number of patients he is able to see in a day. Improvements in the organization of services, the urbanization of the population, the substitution of office for home visits, the increased use of hospitals, the greater availability and utilization of nurses and other allied medical personnel, all have increased the capacity of the individual physician (27). In 1930 the average physician saw about 50 patients a week; now he sees somewhat more than 100 in that length of time (10, 28).

Can physicians continue to increase their efficiency to an extent which will make possible substantially larger case-loads? Among the factors to be considered are length of work week, amount of travel, time with the individual patient, and the organization of services and supporting personnel.

(1) **Work week.**—In 1949 more than half of all physicians in private practice worked 60 hours a week or more (29). It would therefore be hard to make a case for a further increase in the length of work week as a method of improving the efficiency of the medical practitioner.

(2) **Travel time.**—Substitution of office and hospital visits for home visits has saved a substantial amount of physician time. In 1930, 4 doctor visits

in 10 were to a patient's home, now only 1 visit in 10 is to the patient at home (8, 10). In 1935 about 50 percent of all births were attended by the doctor in the patient's home; now some 96 percent of all births are in hospitals (30). These figures suggest the extent to which loss of medical time due to travel has been reduced. They also suggest that there is little possibility of much further time-saving in this way. The pressures, rather, are building in the opposite direction. Hopes for the development of programs for the home care of the aged and other efforts to deemphasize institutional care of the ill, rest on the possibility of more medical service to patients in the home.

(3) **Time with the individual patient.**—The amount of time given to the individual patient varies from one specialty to another, and from one doctor to another. A recent study (31) reported that the family doctor sees about 26 patients a day, most of them in his office. But higher patient loads were found to be fairly common: 17 percent of all doctors see more than 40 patients a day, and 36 percent see more than 30. How much time is enough is perhaps an unanswerable question. But as the quotation at the beginning of this chapter makes clear, many people think that more physician time is needed, rather than less, if the patient is to have satisfactory medical service.

(4) **Organization of medical care services.**—For personal health services, the civilian population of the United States now has a physician-population ratio of about 100 per 100,000 population.³ In a number of places, groups of people composed mostly of employed workers and their families are receiving comprehensive personal health services on an organized, prepaid basis, with no financial barrier to the use of services. These groups are now utilizing the services of from 1 to 1.25 physicians per thousand population (including all

³ In 1957, the civilian population (excluding people in mental and tuberculosis hospitals and similar institutions) numbered 168 million. This population was served primarily by the physicians in private practice. Some civilians also receive service from Veterans Administration physicians, Public Health Service physicians, and physicians on hospital staffs. The civilian population receives service equivalent in total to that of about 170,000-175,000 doctors of medicine and osteopathy.

specialist services except those for the long-term care of mental illness) (32). This is a rate of use of physician time which is somewhat higher than the general rate of use by the civilian population, despite the advantages of organizational patterns which tend to make optimum use of facilities and auxiliary workers. This does not suggest that better organization of service will decrease the need for physicians.

Outlook for the future.—If the individual physician-patient relationship is to be the meaningful personal relationship which both the medical profession and the public believe it should be, it would seem that the individual physician should be able to spend more time, rather than less, with the individual patient. Such a goal can hardly be achieved if we are to have further increases in the patient load of the average doctor.

A GOAL FOR 1975

Medical research has made it possible to save many lives, and to conquer many diseases. Research has also made it possible for many people, with the support of good and continuing medical care, to live useful lives despite the handicaps of heart disease, arthritis, and other chronic diseases. Looking to the future, the promise of medical research is great, but to make the promise a reality requires an adequate supply of good medical care.

Despite better organization for the provision of care and the advance of research, there is no present indication that the requirement for medical services will decrease. There seem rather to be many indications that the increasing effectiveness of medical care and research are together increasing both the need and demand for medical services. At the same time, there seems to be little room for increase in the already heavy load carried by the individual practitioner.

To determine the number of physicians needed by 1975 requires some criterion of adequacy of supply. The Consultant Group is quite aware that the physician-population ratio is a very crude index of adequacy of supply, since it implies a static situation of demand, use, and delivery of medical services. However, the challenge presented by just maintaining the present ratio over the next 15 years is of such magnitude that it would be of little help to develop a more sophisticated index. Consequently, the Consultant Group has set as a minimum goal the maintenance of the current physician-population ratio through

1975. Examination of the factors related to demand, use, and delivery of medical services, although difficult to measure in terms of additional physicians needed, seems to indicate that such a goal is minimal if the present level of medical services is to continue.

To maintain the present ratio of physicians to population (141 per 100,000) will require a total of 330,000 physicians in 1975. If schools continue to produce at their presently planned levels, the number by then would be only 313,000. To have 330,000 physicians by 1975 will require 11,000 graduates a year by that time, 3,600 more than the present number, or almost a 50-percent increase in output.

This output will require expansion of present schools and the establishment of a number of new schools. Since the establishment of a new medical school usually takes about 10 years from the first planning to graduation of the first class, planning the expansion of medical educational opportunities and finding the means of financing such expansion must begin now if the 1975 goal is to be reached. Delay will only magnify the problem.

As a Nation we have come to value and to expect first-class medical service for all our people. But the provision of such service will require more physicians. Without them, the amount and quality of care must suffer. We have here a national health problem, a need of the whole people. The provision of the needed support is without question a national responsibility.

SUMMARY

1. In 1959 the United States has 235,000 doctors of medicine and 14,100 doctors of osteopathy, or a ratio of 133 M.D.'s and 8 D.O.'s per 100,000 population. These ratios have varied but little in several decades.

2. The schools of medicine and osteopathy graduated 7,400 physicians in 1959. About 17 percent of the physicians who entered practice last year were educated in schools outside of the United States.

3. In the years ahead the need for physicians will be stimulated by population growth and increased use of medical services—brought about by improved economic and educational status, the growth of urbanization, more health insurance, and better understanding of the value of medical care.

4. More physicians are going into research, teaching, industrial medicine, and other activities. The development of these types of service has made possible much of the progress of modern medicine, but has meant relatively fewer physicians devoting full time to patient care.

5. To maintain the present physician-population ratio, the expected 1975 population of 235 million will require a total of 330,000 doctors of medicine and osteopathy. This would necessitate the annual graduation of 11,000 students—an increase of approximately 3,600 over the 1959 graduates.

6. If the minimum goal of maintaining present ratios of physicians is to be met, the present medical school facilities must be increased substantially and new schools must be established. This expansion must be undertaken at once. Delay will only magnify the problem.

Chapter II

Supply of Students

The Consultant Group is convinced that an increase in graduates sufficient to maintain the present ratio of physicians to population is a minimum essential to protect the health of the people of the United States. This means a minimum goal of 11,000 physician graduates a year by 1975, or about 12,000 entering students in 1971. Will the number of qualified candidates for admission to schools of medicine and osteopathy in coming years be adequate to permit such a level of graduation?

Some medical school deans even now report increasing difficulties in filling their first-year classes with acceptable students. The high requirements for entrance to medical schools, the increasing competition from other professions, the extended time required for medical education, the high cost of medical education—all these are factors that

seem to make it increasingly difficult for medical schools to attract enough able students from the Nation's rich pool of talented young people.

Whether a young person decides on medicine as a career will depend upon many things, including his interest in medical science, service motives, family tradition, the economic and social status of medicine in the community, and the relative attractiveness of other professions or occupations. A person's ability to complete medical training will vary with his basic intellectual ability, the quality of his previous schooling, and his motivation. Even if the student is otherwise interested and qualified, however, he may still be deterred from entering the medical profession by such factors as the time involved, the relative lack of medical educational opportunity in some parts of the United States, and the cost of obtaining a medical education.

NUMBER OF APPLICANTS

Since the 1930's about two young people have applied to medical school for each first-year student actually enrolled. The only exception was during the immediate postwar years when many returning veterans with GI benefits applied for entrance. For the past 6 years both the ratio of applicants to medical school enrollees and the proportion of young people 20 years old applying to schools of medicine have remained almost constant.

For the class entering U.S. medical schools in the fall of 1958, there were 15,170 applicants. About 1,400 young people sought admission to colleges of osteopathy. The number of medical school applicants was about one-quarter more than the number applying 25 years earlier, barely matching the increase in first-year medical students during this period.

Year	Total applicants per accepted applicant	Applicants per 1,000 population 20 years old
1935.....	1.9	5.5
1940.....	2.0	4.9
1950.....	3.1	10.0
1951.....	2.6	9.2
1952.....	2.2	7.9
1953.....	1.9	7.0
1954.....	1.9	6.8
1955.....	1.9	6.9
1956.....	1.9	7.2
1957.....	1.9	7.0
1958.....	1.8	6.6

Source: References (1) and (2).

For some schools not even the present number of applicants has been sufficient to assure an adequate number of qualified students. Among the young people applying to medical schools, some are not qualified intellectually, as reflected in the fact that rejected applicants have substantially lower average scores in the Medical College Admission Test¹ than do accepted applicants (1). Others are judged unfit in terms of academic background, attitude, emotional stability, depth of interest, physical stamina, or other qualifications. Although a few qualified applicants may be unable to gain admission to any school in a given year because of lack of space, the number of such applicants currently is very small. Thus, while there are more applicants than places, many schools are having serious difficulty in filling their first-year places with well-qualified students.

To reach the goal of 12,000 first-year students in 1971, the number of able young people applying to schools of medicine and osteopathy must be substantially increased. With the increase in college-age population over the next few years, it can be expected that there will be an increased number of applicants to medical schools. At best, however, this increase in applicants would scarcely keep pace with the needed increase in medical school places. It is more probable that such factors as competing career opportunities and the mounting cost of medical education will join together to discourage interest in obtaining a medical education. Already, as will be discussed in the next section, there are signs that many talented young people are being drawn away from medicine to enter other professions.

QUALITY OF STUDENTS

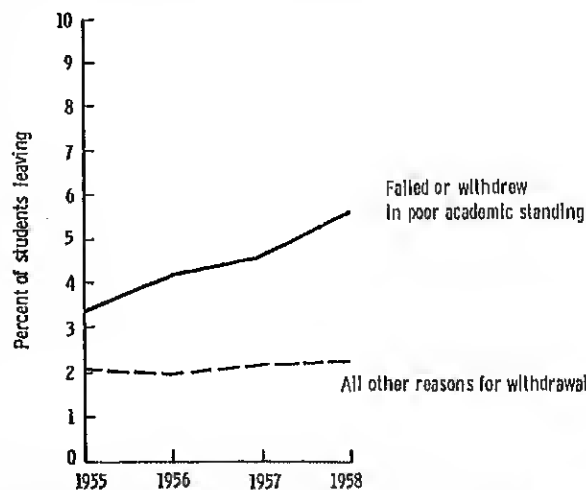
Although medical schools vary to some extent in their entrance requirements, all require a high degree of ability in their students. Some evidence indicates that the quality of medical students is not as high now as it was a few years ago.

One measure of quality of students is the rate of withdrawal because of poor academic standing. Over the past 4 years this rate of failure has been increasing, although the rate of withdrawal for all other reasons has remained practically static (Chart 6).

All applicants to medical school take the Medical College Admission Test. In 1958 the average Medical College Admission Test scores ranged from a high of over 600 for some schools to under 500 for others. Variations among the medical schools in the average Medical College Admission Test scores of their students and in student attrition

rates raise a question as to the factors differentiating the schools with the better students. Recent studies by the Association of American Medical

Chart 6. First-year students withdrawing from medical schools: 1955-58¹



¹ All dates which refer to students are for the academic year ending in the specified date.

Source: Reference (7).

¹ All U.S. medical colleges either require or recommend that an applicant take the Medical College Admission Test, which is a test administered by the Educational Testing Service under the sponsorship of the Association of American Medical Colleges to provide information on the student's ability or information in four fields: Verbal ability, quantitative ability, natural science, and science (3).

Colleges suggest that some relationship may exist between quality of students and residence restrictions and total school expenditures (4, 5, and 6).

The average MCAT scores for first-year classes in 1957 and 1958 tended to be lower in schools with fewer out-of-State students than in schools with more out-of-State students. The schools with the fewest out-of-State students also had a higher proportion of their 1958 first-year classes withdrawing on account of poor academic standing. In the former schools 5.8 percent of the students withdrew; in the latter, 3.8 percent (6).

When the schools are grouped according to the amount of expenditures for operations and research

in 1958, there is a pronounced tendency for the lower schools as measured in the Medical College Admission Test to be schools with lower expenditures. The proportions of first-year student withdrawing because of poor academic standing were 3.8 percent in the high-expenditure schools, 4.5 percent in the middle, and 6.0 percent in the low (6).

Among six groups of medical schools divided both as to proportion of out-of-State students and as to total expenditures, average MCAT scores tended to be lowest in the low-expenditure schools with less than 10 percent out-of-State students (table 9).

Table 9. Average MCAT scores,¹ by percent of out-of-State students and medical school expenditures, 1958

Percent of out-of-State students	ANNUAL EXPENDITURES FOR BASIC OPERATIONS AND RESEARCH		
	Under \$2 million	\$2-3.5 million	\$3.5 million or over
VERBAL AND QUANTITATIVE ABILITY SCORES COMBINED			
10 percent or more.....	514	518	519
Less than 10 percent.....	492	510	510
SCIENCE			
10 percent or more.....	506	512	513
Less than 10 percent.....	474	498	500

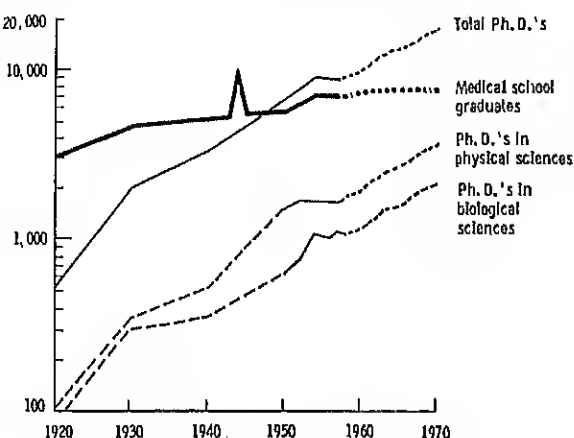
¹ Average as used in this table is the median of the means of each school in the group.
Source: Reference (6).

DETERRENTS TO MEDICAL EDUCATION

If larger numbers of intelligent and well-motivated young people are to be drawn into the medical profession, it is important that a realistic appraisal be made of circumstances that seem to limit the supply of students today. How significant as deterrents to a medical education are such factors as increased competition from other pro-

fessions, the time required for the training of a physician, the availability of opportunities for medical education, and the cost to the student. Clearer understanding of present obstacles to medical education is essential as a basis for devising ways to encourage a larger proportion of a young people to seek entrance to medical schools.

Chart 7. Medical graduates and Ph. D.'s: 1920-58 and estimates to 1970



Note: Plotted on logarithmic scale to show rate of growth.
Source: References (8), (9), and (10).

COMPETITION FROM OTHER PROFESSIONS

Competing opportunities for college graduates are rising rapidly. Over the past several decades the number of persons entering professions requiring a Ph. D. degree has been increasing more rapidly than the number entering the medical profession. Total Ph. D.'s and Ph. D.'s in the biological and physical sciences have increased at rates considerably exceeding the rate of increase of medical school graduates (chart 7).

TIME REQUIRED

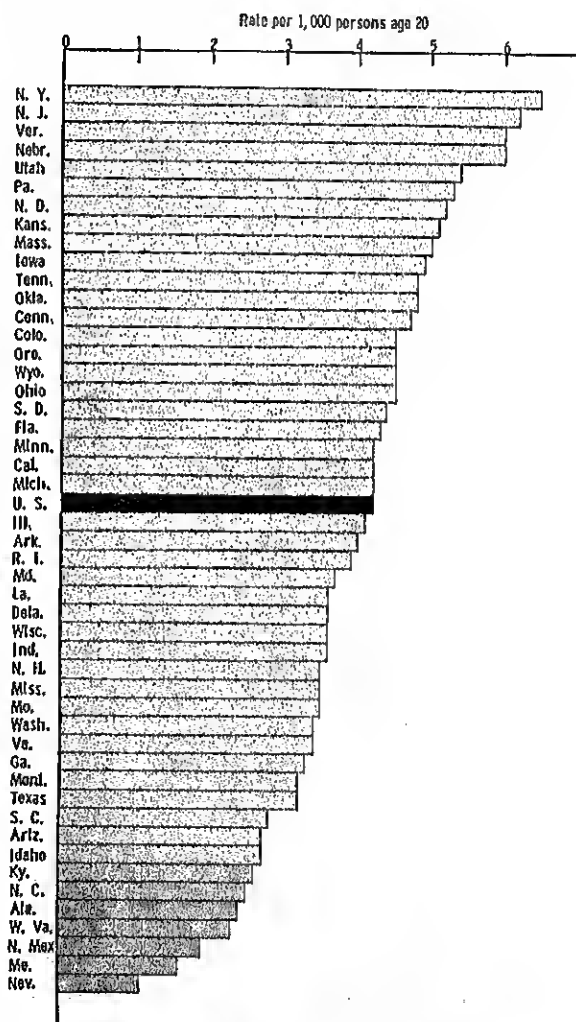
The formal education of physicians requires many years. It is probable that some able students are discouraged from even considering the medical profession by the time requirement. After the years in medical school, the medical student must spend from 1 to 6 years in internship and residency or fellowship training, or a total of 5 to 10 years of graduate education, before he is ready to practice. In contrast, a student seeking a Ph. D. degree can usually start regular employment after 2 or 4 years of full-time graduate education.

LACK OF OPPORTUNITY

There is wide variation among the States in the proportion of young people who attend medical school. On the average, 4.2 young people per 1,000 population age 20 receive a medical education. But among the States the range is from 6.5 per 1,000 in New York to 1.1 per 1,000 in Nevada (chart 8).

Many factors affect the rate at which the young people of a State attend medical school. Import-

Chart 8. State residents in first-year classes of schools of medicine and osteopathy: 1958

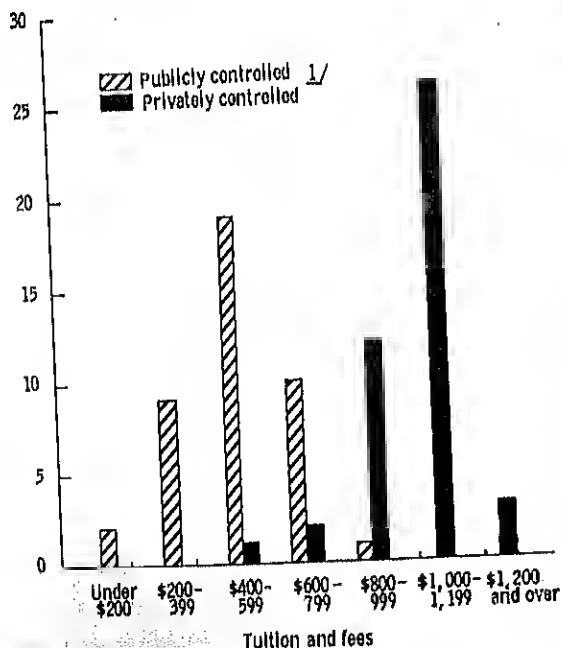


Source: Computed from references (2) and (7).

unity to enter a school with low tuition rates, except to the extent that regional compacts in the southeast and in the West make cooperative arrangements possible. But even in such States as New York and California, each of which has two publicly controlled schools, only about 30 percent of the medical students attend lower cost schools (chart 11). At one extreme, 92 percent of the medical school students who are residents of Arkansas attend medical schools that charge less than \$800 for tuition and fees. At the other extreme, no students from Rhode Island, New Hampshire, Nevada, or Delaware attend schools that charge tuition and fees of less than \$800.

Publicly owned medical schools have to a considerable extent restricted the number of out-of-State students in order to accommodate applicants from within the State. This has had the effect of limiting opportunities for medical education, and particularly lower cost education, for students from States with no public schools or from States

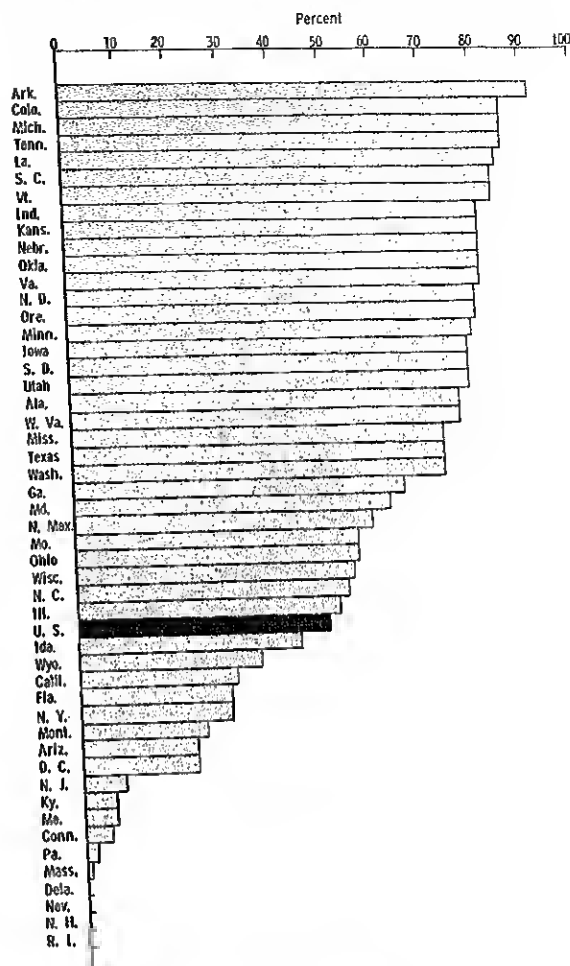
Chart 10. Tuition and fees of medical schools: 1958



Resident tuition and fees.

Source: Computed from reference (7).

Chart 11. First-year students charged less than \$800 tuition, by residence: 1958



Source: Computed from reference (7).

with an excess of applicants relative to number of places in public medical schools. In addition, some schools have been forced to take minimally qualified students who are State residents, even though better qualified out-of-State residents applied.

Medical school tuition tends to be higher than tuition for most other types of advanced training in the same university (12, 13). Since medical training tends to be much more expensive, it perhaps is reasonable that the medical student should pay larger fees. The fact remains that the

student choosing a medical career usually must plan on paying considerably more tuition than, say, the student doing graduate work in chemistry, mathematics, or one of the social sciences.

After the student has completed the 4 years in medical school during which time he has been able to earn very little, he is faced with an internship and usually a residency of several additional years when his earnings at best will be only sufficient for subsistence. Although the stipends of interns and residents have increased in recent years, they still average less than \$2,400 a year for interns and rarely exceed \$3,000 a year for residents, plus allowances in some cases for maintenance. A few

of the best teaching hospitals pay both interns and residents less than \$1,000. Many of the most sought after internships and residencies, moreover, are in large cities where living costs are high.

The cost of a medical education (or of other graduate education) is in addition to the steadily increasing cost of 3 or 4 years of full-time undergraduate college education. While undergraduate college costs vary widely with such factors as control of the college, whether or not the student can live at home, and the section of the country, it is estimated that in 1957 the average cost of a year in college was \$1,500 in publicly controlled colleges and \$2,000 in private institutions.

SOURCES OF STUDENT SUPPORT

During the long years of medical education, the student derives his financial support from one or more of several sources—his own (or his spouse's) earnings, his family, or scholarships and loans.

STUDENT EARNINGS

Earnings of the medical student or his wife can be expected to pay only a part of the cost of medical education. A survey of senior medical students made in 1959 by the Association of American Medical Colleges (11) showed that unmarried students derived an average of 22 percent of their income from vacation and current earnings, while the average for married students was 21 percent from their own earnings and 23 percent from those of their spouses. Few students can support themselves wholly or largely from these sources.

Many medical schools specifically discourage their students from working during the academic year. Some schools forbid them to do so until they have completed the first year of study, others do not allow outside employment at any time during the 4-year course. In general, the practice is to discourage part-time employment except where it clearly will not make serious inroads on needed study time. When students do spend spare time in part-time jobs, they are less free to pursue spe-

cial interests related to the medical curriculum. Changes in medical school curriculums that extend the academic year through the summer months will of course cut down on vacation earning.

Limits exist on the degree to which married students can rely on their spouses' earnings. The wife of a medical student may still be completing her own education. The arrival of children may terminate or severely limit the wife's ability to

FAMILY SUPPORT

Parents of medical students contribute a substantial proportion of the cost of medical education for the unmarried student and a somewhat smaller share of the married student's income. A 1959 survey of senior medical students (11) showed that unmarried students received over 60 percent of their income from their parents, and married students about 35 percent. Most of the money from parents was in the form of gifts.

The median income of the families of medical students graduating in 1959 was \$8,375 (11). Despite the high cost of a medical education, a fifth of the students were from families with incomes of under \$5,000. On the other hand, a fifth of the students were from families with incomes of \$10,000 and over.

Family income	Senior students, 1959	All families, 1957
Median.....	\$8,375	\$4,971
Percent of families:		
Under \$5,000.....	20	51
\$5,000-\$9,999.....	40	41
\$10,000 or over.....	40	8

Source: References (11 and 15).

One medical student in two contracted debts during his medical school years. As would be expected, proportionately more married than unmarried students had debts. The proportion with substantial debts (\$5,000 or more) was considerably higher among students from lower income families than among students from higher income families.

Family Income	Percent of students with debts of \$5,000 or more	
	Unmarried	Married
Average for all families....	11	21
Under \$5,000.....	18	27
\$5,000-\$9,999.....	14	23
\$10,000 or over.....	6	17

Source: Reference (11).

The fact that a sizable proportion of medical students come from above-average income families undoubtedly reflects both the differences in the families' career expectations for their children and their ability to pay for the education. Parents with higher paying professional or managerial jobs are more likely to encourage their children to enter a career such as medicine than are lower income families. The fact remains, however, that the increasing cost of a medical education falls more heavily on a lower income family than on a higher income family, and many young people from professional backgrounds consider it to be out of their financial reach.

Most medical students come from families whose occupational background is professional or managerial. Among students graduating in 1959, about 6 out of 10 had such a background. The proportion of graduates who were sons or daughters of physicians was somewhat higher in private

medical schools (13 percent) than in public schools (8 percent). In both public and private schools, about 3 out of 10 of the students were the children of clerical workers, sales personnel, craftsmen, operatives, service workers, or laborers (11).

SCHOLARSHIPS AND LOANS

Scholarships and loans for medical students are available from a variety of sources. Most medical schools help some of their own students. Private donors and voluntary organizations such as the National Foundation provide a certain amount of support. Other aid has been given by State medical societies, industries concerned with the health field, and State and local governments. In the Southeast and West, regional education programs extend the resident tuition rates of State supported schools to students from other States within the region. But all sources of support combined have not met the expressed need for scholarships and loans, nor have they provided aid comparable to that available to students in related professions.

The medical schools have testified to the need for additional scholarship and loan funds for their students. All but 11 of the 76 medical schools reporting scholarship funds in 1958 indicated that they could utilize considerably greater funds. In some instances the use of available scholarship funds has been limited by special restrictions imposed by the donor, by university policy, or by the committee responsible for administering the funds. Of 81 schools granting student loans, 28 utilized all loan funds available and all but one of these indicated a need for additional funds. Among the 53 schools whose loan funds were not completely used, 21 schools reserved the funds alternately for use in other years or in emergency and in 11 schools restrictions imposed by university policy, or the committee administering the fund prevented full utilization.

prefer to reserve limited available funds for students who have proved their ability to do good work and who might otherwise be unable to continue their education. To confine aid wholly or mainly to upperclassmen, however, may have the effect of discouraging some able students from ever attempting to start medical school.

Outright financial support, other than loans, is less generous for medical students than for students in related fields of specialization. Although the percentage of medical students receiving scholarships or fellowships is about the same as among graduate students in related natural sciences, the dollar amount of the grants made to graduate students is several times as high. The best available figures indicate that even 5 years ago graduate students in the science fields received fellowships three times as large as those received by medical students in 1958 (table 10). Moreover, many graduate students who hold fellowships also have the financial advantage of tuition scholarships and remitted fees.

Many additional graduate students are supported by part-time teaching and research assistantships. In 1954, in fact, more than half of all graduate students in the sciences listed in table 10 had assistantships averaging from about \$1,200 to almost \$1,700. Research assistantships are comparable to scholarships to the extent that many Ph. D.

candidates are able to use their paid research satisfying the requirement for a thesis. The comparable aid available to medical student is a small number of summer research fellowships which usually pay less than alternative summer employment.

There is evidence that persons interested primarily in medicine may be attracted into other fields by the availability of scholarship aid. A study (17) of the career interests of high school seniors with high scores on College Entrance Examinations considered the extent to which the availability of scholarship aid would change choice of career. If scholarships were available only in fields other than medicine, many planning a premedical major would shift to other field of study. In this group, 73 percent said that they would shift to the field of biological sciences if scholarship aid were available in that field. Among the same students, given a choice, 72 percent would shift to physical science, 34 percent to mathematics, or 33 percent to engineering, or 25 percent to social science. If scholarship aid were provided in those fields, the percentage of students planning to enter medicine would be reduced.

A number of the medical student scholarship and loan programs now in operation require the recipient must in return serve for some period of time in a rural area of the State offering a program or render obligated service in some

Table 10. Scholarship or fellowship support of medical students and graduate students in related fields by percent of students supported and average amount per student

Type of student	SCHOLARSHIPS OR FELLOWSHIPS	
	Percent supported	Average amount
Medical students, 1958.....	10	
Graduate students, 1954:		
Bacteriology and microbiology.....	9	
Biochemistry.....	13	
Chemistry.....	12	
Physics.....	8	
Zoology.....	9	

¹ Caution must be used in comparing these amounts since the average for medical students is the mean, and for graduate students, the median.

Source: References (7) and (16)

specified way. For each year of loan support from the Rural Kentucky Medical Scholarship Fund, for example, the recipient must agree to practice 1 year in a county selected by the State board of health. The State of Mississippi offers loans that are canceled entirely after 5 years of general practice in a rural area (18). Although there are many positive values to these programs, the specific commitments for service may prevent the young physician from entering promptly the type of practice for which he is best suited.

Federal aid to medical students in the past has been carefully circumscribed and delimited. Most of the assistance, as in other fields of higher education, has come not as a direct aid but rather as a byproduct of other program goals. The Public Health Service supports undergraduate medical student training through a limited program providing funds for part-time research by outstanding students. A few medical students are still receiving aid under the Korean GI bill of rights. The Department of Defense permits a total of some 360 senior medical students annually to be commissioned and draw active duty pay in return for serving a minimum of 3 years on active duty after completion of internship.

The newly established Federal program of student loans under the National Defense Education Act of 1958 constitutes a source of loan funds for medical students as well as for other students at institutions of higher education.² The National Defense Education Act authorizes annual Federal appropriations rising to \$90 million in 1962 to assist in the establishment of student loan funds by colleges and universities. Each institution must contribute to its loan fund at least 10 percent of the total. A student may borrow in 1 year a sum not exceeding \$1,000 and during his entire course a sum not exceeding \$5,000, depending on need. Although repayment of the loan must begin 1 year after the borrower ceases to be a full-time student, and be completed within 10 years thereafter, the payments may be graduated in amount so as to be smaller in the early years. Actual appropriations for the loan program have totaled \$31 million for fiscal year 1959 and \$31 million for fiscal year 1960. In 1958-59 some 334 students in

41 medical schools received NDEA loans totaling \$178,134, or an average of \$533.³ In addition, loans averaging \$526 were granted to 90 students in 5 schools of osteopathy (8).

Graduate fellowships authorized under the National Defense Education Act (1,000 in 1959 and 1,500 during each of 3 succeeding years) theoretically are available to medical students, but so far have not been granted to such students. These fellowships, carrying an annual stipend of \$2,000 to \$2,400 plus an allowance for each dependent and a grant to the institution to cover tuition and other costs, are restricted to individuals accepted for study in a new or expanded graduate program that will increase the facilities available for graduate training of college or university teachers and will promote a wider geographic distribution of such facilities. Since this type of program is rare in medical schools, this fellowship program is of limited value in medical education.

Medical students are not among the recipients of predoctoral fellowships awarded by the National Institutes of Health of the Public Health Service to qualified persons carrying on studies oriented toward graduate training in the health science fields or related areas. In fiscal year 1959, 682 such predoctoral graduate fellowships were awarded. The fellowships included a stipend of \$1,800 to \$2,200, an allowance of \$500 for each dependent, and the cost of tuition and fees.

Nor are medical students eligible for some 2,000 fellowships awarded each year by the National Science Foundation to predoctoral students in the physical sciences, the life sciences, and selected social sciences. Approximately half of these fellowships are awarded under the Graduate Fellowship Program providing stipends of \$1,800 to \$2,200, plus \$500 for each dependent and allowances for tuition and fees. The new Cooperative Graduate Program accounts for the remaining fellowships, which carry a stipend of \$2,200 plus a flat payment of \$1,800 to the school.

Other Federal fellowships available to graduate students in a field related to medicine are the special fellowships in health physics provided by the Atomic Energy Commission. For a number of years the Atomic Energy Commission has

² In 1959-60 there are an estimated 2.5 million full-time students in colleges and universities in the U. S.

³ As of Sept. 24, 1959, reports still had not been received from 5 colleges or universities having medical schools.

offered stipends of \$2,500 plus dependents' allowances and tuition to about 75 first-year graduate students a year for education and training in health physics. Recently a few fellowships for more advanced graduate education have been made available carrying stipends of \$4,000 plus dependents' allowances and a grant of \$2,500 to the school.

Even now medical students are making increased use of loan funds from a variety of sources. Among medical students graduating in 1959, 32 percent had debts exceeding \$2,000, and 17 percent over \$5,000 (11). Ahead of them was still the problem,

which has been discussed earlier, of financing years of internship and residency training.

A few scholarship and loan programs exist for students in schools of osteopathy. In 1949, auxiliary to the American Osteopathic Association, inaugurated a scholarship program providing awards of \$1,000 each for some seven enterprising students. Other scholarships are available from particular States. The osteopathic colleges, the American Osteopathic Association and the Osteopathic Foundation all administer loan funds for third- and fourth-year students (12).

OUTLOOK FOR THE FUTURE

To achieve a graduation rate of 11,000 a year by 1975, there must be some 12,000 admissions to schools of medicine and osteopathy in 1971. This would be an increase of 50 percent over the present number of admissions.

The rate of increase in the number of young people in the United States is such that 12,000 well-qualified first-year students seems a feasible goal in terms of the Nation's pool of talented young people. However, there are a number of serious obstacles to the achievement of this goal. Important among them are the many competing, attractive, and challenging opportunities in other professional fields, the high cost of a medical education and the long training period, and the limitation of opportunity for medical education in many parts of the United States.

To assure a supply of applicants adequate for the selection of 12,000 well-qualified first-year students, two major programs are necessary.

(1) Increasing and equalizing opportunity by expansion of medical education facilities, particularly in the places where opportunity is limited.

(2) Increasing and equalizing opportunity for young people by very substantial increases in funds available to make it possible to finance a medical education.

Medicine has enormous prestige and drawing power. If existing limitations on opportunity can be removed, medicine should have no difficulty in securing enough well-qualified students.

SUMMARY

1. Deans of medical schools report increasing difficulties in filling their first-year classes with acceptable students, although the ratio of applicants to admissions has remained static.

2. For the past 4 years the proportion of students failing or withdrawing in poor academic standing has been increasing.

3. Medical schools without residence restrictions and with larger budgets tend to have students with higher average Medical College Admission Test scores and lower rates of failure or withdrawal because of academic difficulty.

4. In recent years the number of persons entering various specialized occupations requiring a Ph. D.

degree have increased at rates considerably exceeding the rate of increase of medical school graduates.

5. In spite of the opportunities for personal achievement, public esteem, and community service, some able students are discouraged from even considering the medical profession by the number of years of advanced education required and by the cost of such education.

6. States with a low rate of college attendance and with no medical school tend to have the fewest residents attending medical schools, relative to total residents 20 years old.

7. The medical student or his family, besides financing a college education, must meet expenses averaging \$2,386 for each of 4 years in medical school (\$3,271 for a married student). During an additional 1 to 6 years in internship and residency or fellowship, the average student's stipend will rarely exceed \$3,000 a year with some allowance for maintenance.

8. Wide variation exists among the States in the opportunity available for attending a lower tuition medical school.

9. Publicly owned medical schools have to a considerable extent restricted admissions to students from within the State, thus restricting opportunities for students from other States and, in addition, forcing the schools to accept minimally qualified State residents even though better qualified out-of-State residents have applied.

10. The medical student's earnings while he is in medical school can meet only a small part of his expenses.

11. Families of medical students represent the single most important source of support for the average unmarried student, who receives about 60 percent of his income from his family. For the 60 percent of students who are married, the family provides about 35 percent of total income.

12. Despite the high cost of a medical education, about one-fifth of the students come from families with incomes of less than \$5,000. Although only 8 percent of all families have incomes of \$10,000 a year or more, 40 percent of the medical students come from families with such incomes.

13. Today about 6 out of every 10 medical students are from families whose occupational background is professional or managerial.

14. A substantial proportion of medical students now assume heavy indebtedness for their medical education. Eleven percent of the unmarried students and 21 percent of those who are married have debts of \$5,000 or more by the time of graduation.

15. Although scholarships and loans for medical students are available from a variety of sources, the total amount of such support is inadequate. It does not compare to the amount of aid available to students in related fields. Support available to first-year medical students is virtually nonexistent.

16. The newly established Federal student loan program under the National Defense Education Act of 1958 will be of only minor help in relieving the present shortage of low-cost loan funds for medical students.

17. There is no Federal program of scholarship aid to medical students in any way comparable to the fellowship programs for graduate students administered by the Office of Education, the Public Health Service, the National Science Foundation, and the Atomic Energy Commission.

18. To assure a supply of applicants for the selection of some 12,000 well-qualified year medical students in 1971 will opportunities for medical education be equalized through expansion of medical education plant and through very large increases in funds available to make young people to finance a medical education.

Chapter III

The Medical School

To have some comprehension of what is involved in expanding medical schools and in establishing new ones, it is necessary to have an understanding of the growth of medical education in the United States, the characteristics of a modern medical school, and the costs of establishing and operating a satisfactory school. Over a period of years standards of medical education have been raised continuously and there has been a broadening of the scope and depth of the teaching program and of the related programs of medical care and research. In a very real sense, the needs for physicians cannot be met by numbers alone. They will be met only as an expanded program maintains and enhances the quality of medical education.

At the core of medical education is the 4-year curriculum which leads to the medical degree. This basic education in the medical and clinical sciences is the primary responsibility of the medical school. Increasingly, however, the medical school is assuming heavy responsibility for other educational programs—for internship and residence programs, for the continuing education of practicing physicians, and for the education of other professional groups. In the following pages, medical schools in the United States are discussed—their history; their number, control, and location; their size; their responsibilities and functions; the curriculums; their faculty; their facilities and administration; and their budgets.

HISTORY

Fifty years ago most medical schools in the United States were characterized by minimal entrance requirements, limited course offerings, makeshift clinical laboratory facilities, and generally low standards of teaching and performance. Few of the more than 150 schools had any claim to being educational institutions.

In 1892 Harvard Medical School had increased the length of its course to 4 academic years and required written examinations before the degree was awarded. Johns Hopkins University School of Medicine, "the first medical school in America of genuine university type," (1) was founded in 1893.

Even before this time the American Medical College Association, established in 1876, had been moving slowly toward the definition and enforcement of higher standards among its member institutions. In 1904 the Council on Medical Education of the American Medical Association began

the inspection and classification of medical schools (2). The American Osteopathic Association has also established educational standards and a system of inspection and appraisal by this time (3).

Abraham Flexner's influential report, *Medical Education in the United States and Canada*, published in 1910, objectively appraised the medical schools and stimulated action to close the poorest schools and bring the remainder to an acceptable standard (1). Subsequently, rapid improvement began to take place so that by the 1930's most of the substandard medical schools had been closed. Schools defined increasingly rigorous requirements for admission of students. Recommended curriculums had been developed for parts of the medical school course, and increasing attention was being given to innovation and experiment.

The past two decades have brought further

important changes. Shifts in organization and emphasis have occurred. Problems of coordinating specialized subjects and of fitting new scientific knowledge into the medical school course have led to experiments in teaching methods

and curriculum. Research activities have been markedly increased. Graduate education in the medical specialties has commanded an increasing share of medical school resources, and has also contributed to educational and research potentials.

NUMBER, LOCATION, AND SIZE

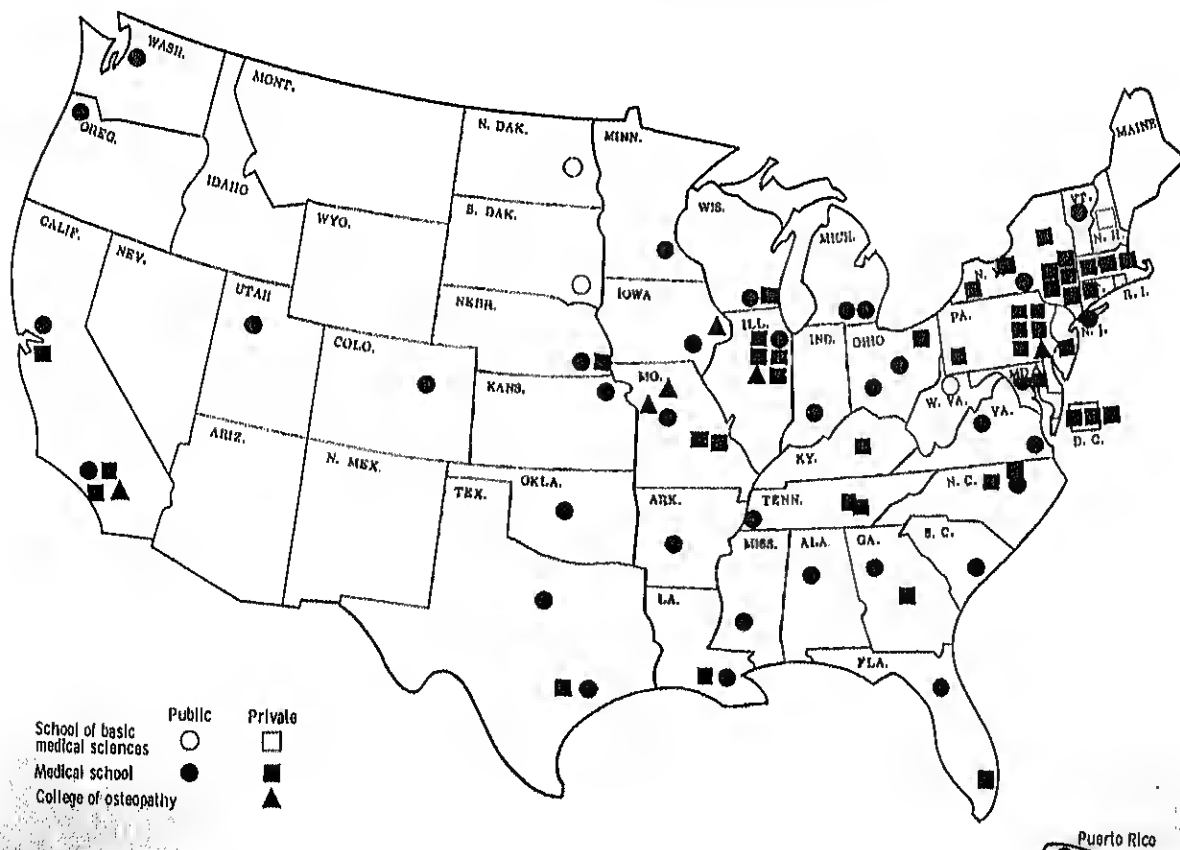
Today the United States has a total of 85 medical schools and 6 schools of osteopathy (appendix table 8). Eighty-one of the 85 medical schools and all of the schools of osteopathy offer a 4-year curriculum. Four schools of basic medical sciences offer only the first 2 years of the program, after which the students transfer to a medical school with clinical facilities to complete their training.

Among the 85 medical schools slightly more

than half (45) are private schools. Since 1940, three new private and five public schools have been established; one private and five public schools have expanded from 2-year to 4-year programs. The six schools of osteopathic medicine, the newest of which was established in 1916, are all privately controlled.

As shown in chart 12, medical schools are most heavily concentrated in the northeastern United

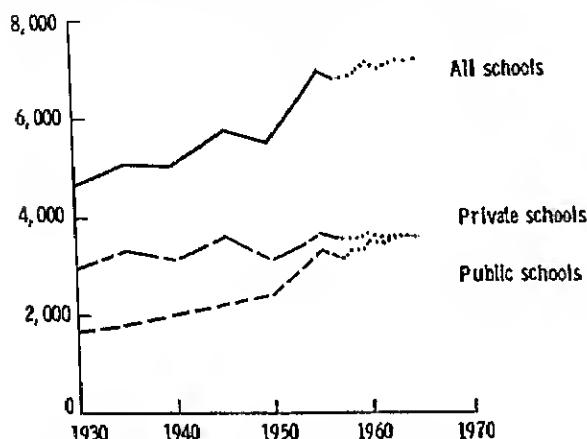
Chart 12. Location of schools of medicine and osteopathy: 1959



States. Nine States have no medical school, and four have only schools of basic medical sciences. Completion of the new 4-year school at the University of Kentucky will reduce from 15 to 14 the number of States¹ without a public school.

Enrollment in medical schools has climbed

Chart 13. Graduates of public and private medical schools: 1930-65¹



¹ Actual 1930-59 and estimates 1960-65 at present rate of graduation.

Source: Appendix table 10.

markedly in recent years, from 22,000 in 1941, to 26,000 in 1950, and to 29,000 in 1958. There are 1,900 students enrolled in colleges of osteopathy (appendix table 9).

The number of graduates has risen similarly, with a greater proportion of the increase in publicly controlled schools than in private schools (chart 13). Enrollment in individual 4-year medical schools ranges from 179 to 768, with an average of 370.

Size of student body	Number of 4-year medical schools, 1958		
	All schools ¹	Public	Private
Total.....	81	37	44
Under 200.....	5	3	2
200-299.....	23	10	13
300-399.....	30	13	17
400-499.....	10	4	6
500-599.....	9	4	5
600-699.....	2	1	1
700 and over.....	2	2	—

¹ Enrollment for new 4-year schools which did not have all 4 classes in attendance in 1958 has been estimated.

Source: Reference (4).

RESPONSIBILITIES AND FUNCTIONS

From the viewpoint of society the responsibilities of the medical school can be expressed in broad terms: to provide the opportunity for a medical education to qualified young people, and to supply the physicians needed for medical service, teaching, and research.

In many places the medical school is the nucleus of a complex medical center with wide responsibilities for education, basic and clinical research, and service. It provides graduate education for interns and resident physicians, as well as post-graduate education for practicing physicians. It cooperates in the training of dentists, nurses, and allied health workers. It may have an active

¹ The District of Columbia also has no public medical school.

role in the education of Ph. D. candidates in the basic biological and medical sciences. Its hospital frequently serves as a medical referral center for a State or region.

With the increase of specialization among physicians, no school today can organize its teaching program for the preparation of general physicians only. Since the 4 years of medical school provide the only professional educational experience common to all physicians, the program must provide the basic education necessary for preparation in any of the specialties, including family practice. A statement approved by the Association of American Medical Colleges and the American Medical Association in 1957 stressed

that the objectives of all medical schools:

"... should clearly indicate that an undergraduate medical education provides merely a sound foundation for further education during the internship and residency period, as well as throughout professional life. Four years of education in medical school is not by itself sufficient to prepare a physician for practice today." (5)

The four schools that offer only the first 2 years of the 4-year program—the schools of basic medical sciences—have a special function to perform (6). By increasing the number of preclinical students, the schools of basic sciences allow more

efficient utilization of existing clinical facilities, which in many of the 4-year schools are sufficient to serve both their own preclinical students and those who transfer from the schools of basic medical sciences. As do the 4-year schools, the schools of basic sciences offer opportunities for cooperation between early education in medicine and graduate university education in the social, biological, and related physical sciences. The problem of coordinating the first 2 years of training in one school with the last 2 years in another exists however. This has been surmounted in most instances by more or less formal agreements among the schools on admission requirements, curriculum, and methods of teaching.

CURRICULUM

Over the past few decades, the extraordinary growth of medical knowledge has confronted the medical schools with difficult problems in the development of curriculums. In the early years of this century, the basic medical school curriculum included the sciences of anatomy, biochemistry, physiology, pharmacology, and pathology, and the clinical fields of medicine, surgery, obstetrics, and gynecology. But now, in addition to the basic curriculum, which in itself has increased remarkably in depth, the typical medical student must understand such areas as preventive medicine, pediatrics, and psychiatry—among many others that could be listed. The social sciences are beginning to make their appearance in medical school programs.

It is not within the purview of this Consultant Group to criticize or recommend various approaches to curriculum content and length, but it is imperative to point out that the length and content of the curriculum do have a relationship both to the cost of medical education in dollars and time and to the quality of education imparted.

It has not been possible to solve the problems of curriculum by simply increasing the content and length of the training period. The continuation

of the process of stuffing new facts into already overcrowded courses means that they become encyclopedic rather than thought-provoking. Freeborn of the University of California has pointed out with respect to a university education, "The goal . . . is to teach our students how to use facts as craftsmen use tools, to evaluate facts for what they are worth, to use them as building blocks in the syntheses of programs of behavior, thought, or action. . . . The one hope of coping with this dual problem of increased numbers of students and the increased content of available knowledge . . . lies in the almost complete revision of the material that is presented to the classes. . . . Equipped with principles, and that assumes that the student knows the facts on which the principles are based, he is able to plot a course of action that has a high probability of success. And this applies equally well to personal behavior, the conduct of business, or the development of scientific concepts." (7)

The Consultant Group is of the opinion that continuing searching examination and critical evaluation of teaching methods and curriculum construction are necessary to demonstrate the best and most economical way of obtaining high quality medical education.

FACULTY

In past years, much of the medical school teaching, particularly in the clinical years, was done by practicing physicians who gave a few hours a day or often as little as one lecture or one clinic a week. Increasingly, schools are recognizing that each department must have at least a core of full-time teachers, with volunteers used primarily to enrich and diversify the program. The Deitrick report stated: "The need for full-time men who can devote all their time and energy to the work of a medical school and its teaching hospital is clear. In their present magnitude, the activities of large medical schools and medical centers can no longer be properly organized and carried out without at least a nucleus of full-time faculty members." (8)

The location of a medical school has an important effect on the use of full-time and part-time faculty. Although schools in large cities can draw on local practicing physicians to supplement their full-time staffs, schools in isolated locations have more limited community medical resources. Thus in schools in smaller places, usually more of the teaching is done by full-time staff members. Even in the large communities, however, recent years have seen a substantial increase both in the number of full-time teachers and in the proportion of the teaching load carried by this group (9).

The growth of equivalent² full-time faculty in 17 medical schools recently studied is shown below:

Function	Equivalent full-time faculty		Percent Increase
	1951	1959	
All faculty.....	1,573	3,096	97
Teaching.....	837	1,526	82
Research.....	536	1,217	127

Source: Reference (9).

Medical education requires liberal ratios of faculty to students, with laboratory and small-group

² The discussion in this chapter is in terms of "equivalent full-time" faculty. Each full-time faculty member is counted as 1. Part-time faculty is converted into full-time equivalents on the basis of 1,920 hours a year, e.g., a man who gives 960 hours a year is half a full-time equivalent. See reference (10) for description of method and earlier data on this subject.

teaching stressed in preclinical subjects and with clinical clerkships and bedside teaching emphasized in the last 2 years. The growth of graduate education and research has required expanded faculty.

Among medical schools today the variation in faculty size is great. The number of faculty members, in full-time equivalents, ranges from less than 100 to more than 300 (including persons with rank of instructor or higher engaged in teaching, clinical service, research, and administration). In addition to this faculty, considerable teaching is done by the interns and residents of the teaching hospitals.

Schools with large programs for research, medical care, and training of residents and Ph. D.'s have relatively large faculties. A third of the schools of the United States have an average of about 7 equivalent full-time faculty members to 10 students (some 280 for a school with 400 students). For the middle third of the schools, the average is 160 equivalent full-time faculty members for a school with 400 students. The low third averages 3 faculty to 10 students with the equivalent of 120 full-time faculty members for the 400-student school.

The Consultant Group feels that this average for the bottom third of the schools—3 equivalent full-time faculty for 10 students—can be considered a minimum acceptable level if it includes a balance of full-time and part-time teachers. A faculty of at least this size is necessary to insure the minimal research and medical service which the proper medical educational environment requires.

The following tabulation shows full-time equivalent faculty for preclinical and clinical departments for schools with 400 students at the high, average, and minimum faculty levels. This can serve as a useful reference in the planning for new schools:

Department	Equivalent full-time faculty for 400 students		
	High	Average	Minimum
Total.....	280	160	120
Preclinical.....	65-75	50-70	35-45
Clinical.....	205-215	90-110	75-85

Medical education faces a real challenge in assuring an adequate number of faculty members. In recent years some medical schools have experienced difficulty in filling budgeted full-time faculty positions. In 1958, 6 percent of the 11,000 budgeted full-time faculty positions were reported vacant (11).

The importance of economic reasons for the reluctance of physicians to accept full-time faculty positions is suggested by a recent study by the National Academy of Sciences (4). Most medical science fellowship holders were found to prefer a

full-time salaried academic career, but approximately a third of the group felt they could not accept such positions under the present economic realities of academic life. Of the interns and residents in major teaching hospitals, one in four wanted careers in full-time or essentially full-time academic positions in a basic science department or research institute. Despite these problems, the new schools which have been established in recent years have all found it possible to secure sufficient well-qualified faculty.

FACILITIES AND ADMINISTRATION

For instruction in the basic medical sciences, the medical school needs classroom and laboratory facilities, a library, administrative offices, and an auditorium. In many schools, these facilities form an integral part of a medical center that provides space also for the teaching hospital, research activities, and schools for related health professions such as dentists, nurses, and pharmacists.

CLASSROOM AND LABORATORY FACILITIES

Some idea of the amount of space needed for classroom and laboratory facilities can be obtained from the type of medical sciences building recently constructed for the new medical school at the University of Florida. This unit, designed to accommodate 64 new students annually, provides 12,000 to 15,000 square feet for each of seven major departments. Space is also provided for a library, a 535-seat auditorium, administrative offices, individual research laboratories, reception room, shop, storage, animal quarters, student lounge, and locker rooms (12).

Relatively few standards have been developed by the medical profession or by the Association of American Medical Colleges for the type and quality of preclinical teaching facilities appropriate for a modern medical school. Emphasis

has been placed on providing buildings and equipment conducive to productivity of faculty and students in the fulfillment of the total objectives of the school. It has been recommended that basic science teaching facilities adjoin the hospital so as to promote cooperative teaching efforts and allow all departments ready access to patients. Further refinement of these and other standards and specifications is needed.

LIBRARY

As the literature of medicine has grown in amount and complexity, the medical school library assumes an increasingly significant role in the educational and research programs of the school. Medical school library collections have been increasing in size. At the time of a 1934-39 survey, the median size of the 4-year medical school library was 20,000 volumes, with 272 periodicals.

instruct medical students in the use of medical literature, acquainting them with library resources available and preparing them to draw upon such resources throughout their medical careers.

INTEGRATION OF UNIVERSITY AND MEDICAL SCHOOL

Dr. Flexner's principle that a medical school "is properly a university department," was recently reaffirmed in a statement of policy by the Association of American Medical Colleges and the American Medical Association's Council on Medical Education and Hospitals. This statement recommended that wherever possible medical schools be part of a university, "since a university can so well provide the milieu and support required by a modern medical school." (5)

In actual practice, relationships of medical schools to their parent universities—and only 10 out of 81 4-year schools lack university affiliation—have tended to be somewhat remote. Even among medical schools located physically in the centers of their universities, relatively few have had mutually rewarding associations with the students and faculty of other graduate departments. While a constructive relationship offers much to both the medical school and to other departments, problems and difficulties can arise on both sides of this relationship.

Special problems of administrative coordination arise when the medical school forms a part of a complex medical center. In some of the larger medical centers, the university has appointed a director or vice-president of medical affairs to have jurisdiction over not only the medical school but also the university hospital and the schools of dentistry, nursing, and other allied educational programs.

Recent expansion of research and training in the basic sciences has, however, dramatized the interdependence of the medical school and the rest of the university. The increasing pressure to save money, facilities, and faculty time through joint programs has been another factor encouraging closer association.

PROXIMITY TO UNIVERSITY

Should the medical school be located physically in the same community as the university, even if this community is not a large city where hospitals and patients are normally concentrated?

The physical proximity of the university and the medical school is of increasing importance as medicine is becoming more and more involved in research in the physical and the social sciences. Increasingly the hospital itself is the laboratory for graduate training in research in fields other than medical science—economics, sociology, anthropology, and business administration, to name only a few.

Proximity to the university, the potentialities for development of adequate clinical facilities, assurance of continuing financial support, and accessibility to patients and physicians throughout the State are more important than the size of the community in the selection of a location for the medical school.

The public medical schools are usually in smaller cities than are the private schools:

Size of city	Number of medical schools		
	All schools	Public	Private
Total.....	81	37	44
500,000 and over.....	41	9	32
100,000-499,999.....	26	16	10
50,000-99,999.....	7	5	2
25,000-49,999.....	6	6	.....
Under 25,000.....	1	1	.....

Source: Compiled by Public Health Methods from reference (4).

POLICIES ON ADMISSION OF STUDENTS

Through its policies and practices relating to the admission of students, the medical school exercises considerable control over the quality of its student body. Today the schools are generally agreed on the basic academic background needed,

although there is variation on specific courses or hours required. Perhaps the most controversial of the nonacademic admission requirements are those restricting admission according to geographic residence. Most of the public medical schools and some of the private schools give preference in admission to students who live in the State in which the school is located. The extent of this type of restriction varies from school to school. In 20 schools a 2-year average of first-year students showed 5 percent or fewer out-of-State students; in 23 other schools the proportion of out-of-State students ranged from 6 to 25 percent (15).

Such restrictions as to residence are imposed to assure opportunities for medical education to the students from a particular State or group of States. But rigid application of this policy may prevent the school from choosing the best qualified applicants.

The problem needs a flexible approach so that opportunities for medical education in a State's medical school are not denied to qualified residents of that State and, at the same time, enough qualified out-of-State students are admitted to assure an excellent student body with diverse backgrounds and points of view.

THE TEACHING HOSPITAL

The teaching hospital, which plays a central role in the functioning of a medical school, provides the laboratory in which medical students acquire their basic clinical skills and also offers opportunities for clinical research by faculty members, and for the training of interns, residents, practicing physicians, nurses, and many allied health workers. In a teaching hospital, both faculty and students may improve the quality of medical care by contributing to the knowledge of disease or by developing new methods of therapy. Through the teaching hospital, the medical school provides clinical service to the community.

Type of control.—Teaching hospitals may be grouped in three categories: (1) hospitals owned by universities or medical schools; (2) hospitals not owned by but closely integrated physically, administratively, and financially with medical schools; and (3) affiliated hospitals that function as separate institutions but grant privileges in varying degrees to medical schools. Table 11 shows the relationship of the teaching hospitals to the 81 4-year medical schools.

Table 11. Control of principal teaching hospitals of public and private 4-year medical schools in the United States: 1959

Control of hospital	NUMBER OF SCHOOLS		PERCENT OF SCHOOLS	
	Public	Private	Public	Private
Total.....	37	44	100	100
Owned by university or medical school.....	25	14	68	
Community hospitals integrated physically, administratively, financially.....	12	19	32	
City or county hospital.....	7	4	19	
Nonprofit association.....	5	15	13	
Affiliated hospitals only.....		11		

Source: Compiled by Division of Public Health Methods from medical school catalogs.

Many of the schools with university hospitals make use of affiliated hospitals as well, so as to provide the needed number and variety of patients.

If the teaching hospital is controlled directly by the medical school or university, the faculty and patients can be used for teaching unencumbered by the problems of separate staffs with separate lines of authority. Regardless of the manner of affiliation, medical school or university control of the teaching hospital staff is essential for maintenance of a suitable educational program. If the school does not own the teaching hospital, it must have the unquestioned right to appoint the attending staff, with clinical teachers appointed either on nomination by the school or by agreement in conference between the school and the hospital.

Number of beds.—The principal teaching hospitals of the 4-year medical schools range in size from under 200 to over 3,000 beds. The median size is a little over 600 beds. Hospitals of the private medical schools tend to be somewhat larger than those of the public schools; a finding which may be explained by the fact that a higher proportion of the private schools are in large cities.

Beds in principal teaching hospital	Number of schools		
	Total	Public schools	Private schools
Total.....	81	37	44
Under 400.....	22	10	12
400-599.....	14	9	5
600 or more.....	45	18	27

Source: Compiled from reference (16).

INTERNS

Years ago the internship (a year of hospital experience) was designed to give the new graduate his initial contact with responsibility for patients. Since the development of the clinical clerkship for the third- and fourth-year medical student, the internship no longer provides such initial patient contact but rather is one of several graded steps toward the assumption of total responsibility for patient care.

Few clear lines remain between the clinical clerkship and the internship. Frequently each involves to a greater or lesser extent the same facilities, patients, and faculty. What are the unique functions of the internship year, and are these functions being fulfilled? What responsibility should the medical school carry for this year which is presumably essentially graduate training? Today there are no clear answers to these questions but the Association of American Medical Colleges has undertaken a study which should assist in the clarification of the problems associated with this phase of education.

Not all internships are provided in hospitals used by medical schools for undergraduate teaching. Of some 10,000 intern positions filled in 1957 in hospitals approved for intern training, 45 percent were in hospitals participating in undergraduate medical education as well (16).

RESIDENTS

Residencies have as their primary function the training of medical specialists in a variety of clinical and related fields. Residencies are offered in 26 specialties and in general practice. Most residencies are served in a hospital setting, although organizations other than hospitals offer training in the subspecialties of preventive medicine (aviation medicine, occupational medicine, and public health). As with internships, residency training is not limited to hospitals affiliated with medical schools. Over 1,200 hospitals offer these training opportunities, of which the 17 percent affiliated with medical schools provide 46 percent of the residency positions.

The period of residency may be as short as 1 year, but for Board certification in a specialty the required time varies from 2 to 5 years. As part of his education, the physician serving a residency provides patient care or other services and may also assist in the teaching of undergraduate medical students or interns. It is difficult to analyze the resident's time in terms of patient care, teaching research, and his own education, since the four frequently go on simultaneously. A recent study in a large university hospital (17), however, indicated that more than half of the residents spent

staff would be required just to maintain the present level of patient care, exclusive of any teaching or research. The same study showed that the resi-

dents on the average spent only about a quarter of their working time away from patient service, that is, in research and education.

BUDGETS

The basic operating budgets (exclusive of grant-supported research) of the individual medical schools vary widely in amount—in 1958, from a minimum of \$750,000 to a maximum of nearly \$5 million. This variation is more closely related to faculty-student ratio than to the number of undergraduate medical students.

The following tabulation shows typical high, medium, and low operating budgets for small, medium, and large medical schools. In general the schools in the high budget group are also in the top third in respect to size of faculty, while the low budget schools come close to the minimum level of faculty size that is consistent with proper school functioning.

Budget level	Typical operating budgets ¹ of medical schools (millions of dollars)		
	Number of students		
	300	400	500
High.....	\$2.0	\$2.7	\$3.4
Medium.....	1.6	2.0	2.4
Low.....	1.1	1.4	1.7

¹ Exclusive of grant-supported research.
Source: Calculated from reference (11).

Although many factors besides funds available affect the quality of the teaching program, nevertheless, one of the serious problems of medical education today is the underfinanced school. The typical underfinanced school, as compared with its better-financed counterpart, has a small full-time faculty. Most of its clinical faculty are volunteers, resulting in a lack of academic component in the clinical years; its freshman class is selected from a less well-qualified group of applicants; its graduate program is fairly limited; very little research is done; and the postgraduate activities are infrequent and poorly organized.

While most of the present medical schools more than meet the minimal education standards required for accreditation, the underfinanced schools are hard-pressed to maintain an educational program within the minimal requirements. In the meantime, the expansion of knowledge both in breadth and depth has raised the desirable standards of medical education above the minimum required for accreditation. Continued underfinancing of some of the medical schools will make it impossible for these schools to meet desirable standards of medical education.

SUMMARY

1. Today the United States has 85 schools of medicine, 81 of them offering the full 4-year program and 4 of them only the first 2 years. In addition there are six schools of osteopathic medicine. Of the 85 medical schools, 45 are privately owned. Recent years have seen a more rapid increase in the number of public than of private schools. Nine States still have no medical school,

and four other States are without a 4-year school. Enrollment in 4-year medical schools ranges from less than 200 to over 750 students, with an average enrollment of 370.

2. From the viewpoint of society the responsibilities of the medical school can be expressed in broad terms: to provide the opportunity for a med-

ical education to qualified young people, and to supply the physicians needed for medical service, teaching, and research. The medical school also provides graduate education for interns and residents, and postgraduate education for physicians. Its hospital frequently serves as a medical referral center for a State or region.

3. Schools of basic medical sciences can increase the opportunities for preclinical education, thereby allowing more complete use of existing clinical training facilities for third- and fourth-year students.

4. Continuing searching examination and critical evaluation of teaching methods and curriculum construction are necessary to demonstrate the best and most economical way of obtaining high quality medical education.

5. Medical education requires high ratios of faculty to students, with laboratory and small-group teaching stressed in preclinical subjects and clinical clerkships and bedside teaching emphasized in the last 2 years. Increasingly, schools are finding that each department must have at least a core of full-time teachers, with volunteers used primarily to enrich and diversify the program.

6. Facilities required by a medical school include adequate classrooms and laboratories, library, administrative offices, auditorium, space for research, and clinical facilities. Standards and specifications for medical school facilities designed to provide for changing needs and conditions should be developed.

7. To achieve its maximum potentialities a medical school should be an integral part of a university. In recent years, the need for greater cooperation between medical school and university has been emphasized by the growth of research in the basic sciences and by the pressure on medical schools to expand their programs of graduate education.

8. Advantages of close physical proximity to the university have generated support for placing

medical schools in the same community as the university, if adequate clinical material can be assured. This has been possible where the parent university has been able to construct a teaching hospital as an integral part of the teaching facilities.

9. Most of the public medical schools and some of the private schools give preference in admission to students who live in the State in which the school is located. Rigid application of this policy may prevent the school from choosing the best qualified applicants, or from selecting a student body with desirably diverse backgrounds and interests.

10. Two-thirds of the public medical school have teaching hospitals owned either by the school or by the parent university. Private schools make greater use of hospitals which, while closely integrated or affiliated with the schools, are not owned by them. Among the principal teaching hospitals of the 81 4-year schools, 22 have under 400 beds, 14 have between 400 and 600 beds, and 45 have 600 beds or more.

11. After graduation from medical school, most physicians spend a year in a hospital internship. Many physicians continue (or return later) for 2 to 5 years of residency training in a specialized field of medicine. About 45 percent of the internships and a slightly higher proportion of the residency positions are in teaching hospitals. These interns and residents, in addition to receiving graduate education, provide very substantial amounts of medical care and may participate in medical research.

12. A number of schools are today facing increasing financial difficulties. A school with an undergraduate enrollment of 400, and with a minimum adequate faculty now needs a basic operating budget of about \$1.5 million (exclusive of grant-supported research) if it is to meet properly its educational responsibility. A number of schools have budgets below this minimum.

Chapter IV

Financing Medical Schools

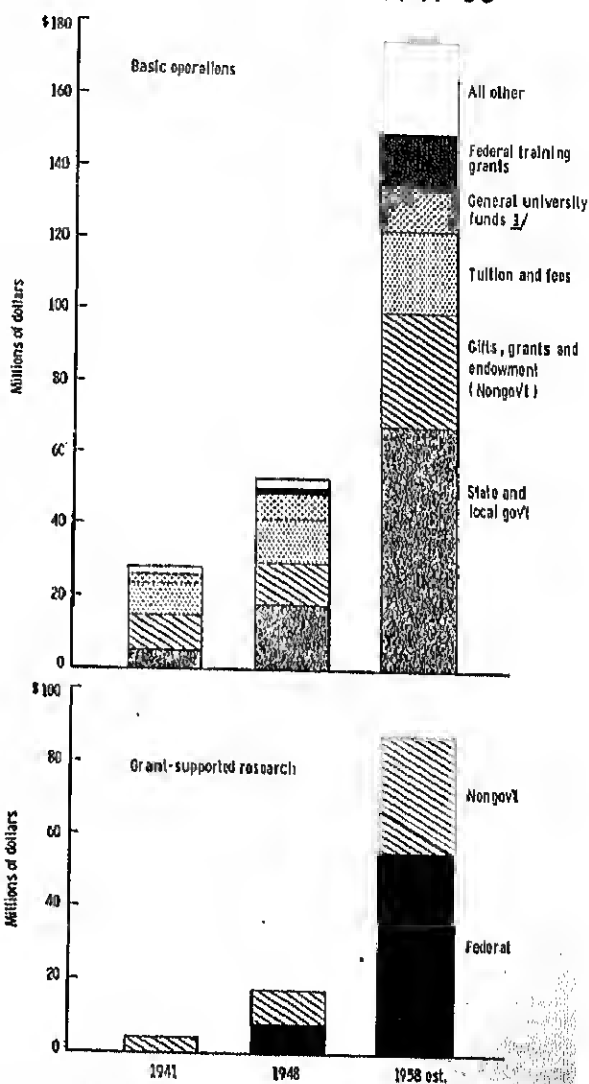
Fifty years ago, in the heyday of the proprietary medical school, student fees were the primary source of financial support for medical education. While a few universities carried substantial financial responsibility for their medical schools, a third of the schools had less than \$10,000 a year in operating funds—all from student fees. Such lack of support was reflected in squalid facilities and inadequate faculties. This situation resulted in the outspoken Flexner Report of 1910 (1).

An important effect of this report was to focus public attention on the financial needs of medical education, and to stimulate substantial philanthropic contributions and university support (1). Less than 20 years later, in 1927, the Commission on Medical Education (2) found remarkable changes in the financial picture. The 63 schools studied by the Commission had incomes totaling \$12 million. The sharp increase in budgets had come about primarily because of the growth of foundation and other private giving and because of increasing activity of State universities. The next decade saw a continued growth of support from a variety of sources, and by 1941 financial support of medical education totaled \$32 million.

In the 1940's the greatest change in the pattern of support was the increase, both relative and absolute, in the contributions of State and local governments (chart 14). By 1948 total support had risen to \$71 million, of which State and city appropriations amounted to some \$18 million; gifts, grants, and endowment, \$20 million; and tuition and fees, \$12 million (3).

With the increased responsibilities which medical schools have assumed in recent years, new sources of support have appeared. The burst of research activity has been substantially supported by grants and contracts from the Public Health Service, other Federal agencies, and private or-

Chart 14. Sources of financial support for medical schools: 1941-58



¹ Private schools only. General university funds for public schools included with State and local governmental support.

Source: Computed from reference (3) and unpublished estimated data summarized in reference (4).

ganizations. Medical care provided as an adjunct to clinical teaching is being financed to an increasing degree by insurance, public assistance, and other third-party payments. While the medical schools have been able to do a great deal for themselves, very considerable aid for the construction of hospitals has come from the Hill-Burton program of the Public Health Service; for the construction of student dormitories, from the college housing

program administered by the Community Facilities Administration of the Housing and Home Finance Agency; and for the construction of research facilities from grants of the Public Health Service.

The following pages summarize the current status of support for operation of medical schools, for grant-supported research, and for construction of medical teaching and research facilities.

SCHOOL EXPENDITURES

In 1958 the 85 medical schools in the United States spent an estimated total of \$264 million.¹ Of this amount \$176 million was for basic operations and the remaining \$88 million for grant-supported research. These figures do not include the costs of operating teaching hospitals. In the same year the six osteopathic colleges spent \$6.8 million of which \$6.6 million was for basic operations and \$200,000 for grant-supported research.

In the financing of medical schools, the significance between basic operations and separately budgeted (most of which is grant supported) research must be properly understood.

Income for basic operations represents either money over which the school has complete control or money which, while designated for specified uses, is completely consistent with basic operational purposes. Federal training grants which are designed to strengthen instruction in cardiovascular disease, cancer diagnosis and therapy, or psychiatry, are examples of designated funds. In addition to providing support in specific program areas, they may free funds that can go to the strengthening or initiation of teaching in other areas.

Income for grant-supported research cannot be considered in this same light. The uses to which this income must be put are not under the complete

control of the medical school, except that the school must use its authority to ensure that such uses are confined to the purposes for which they are designated. Research is important to the quality of a school's basic operations, but other aspects of basic operations are equally important. A proper balance is essential.

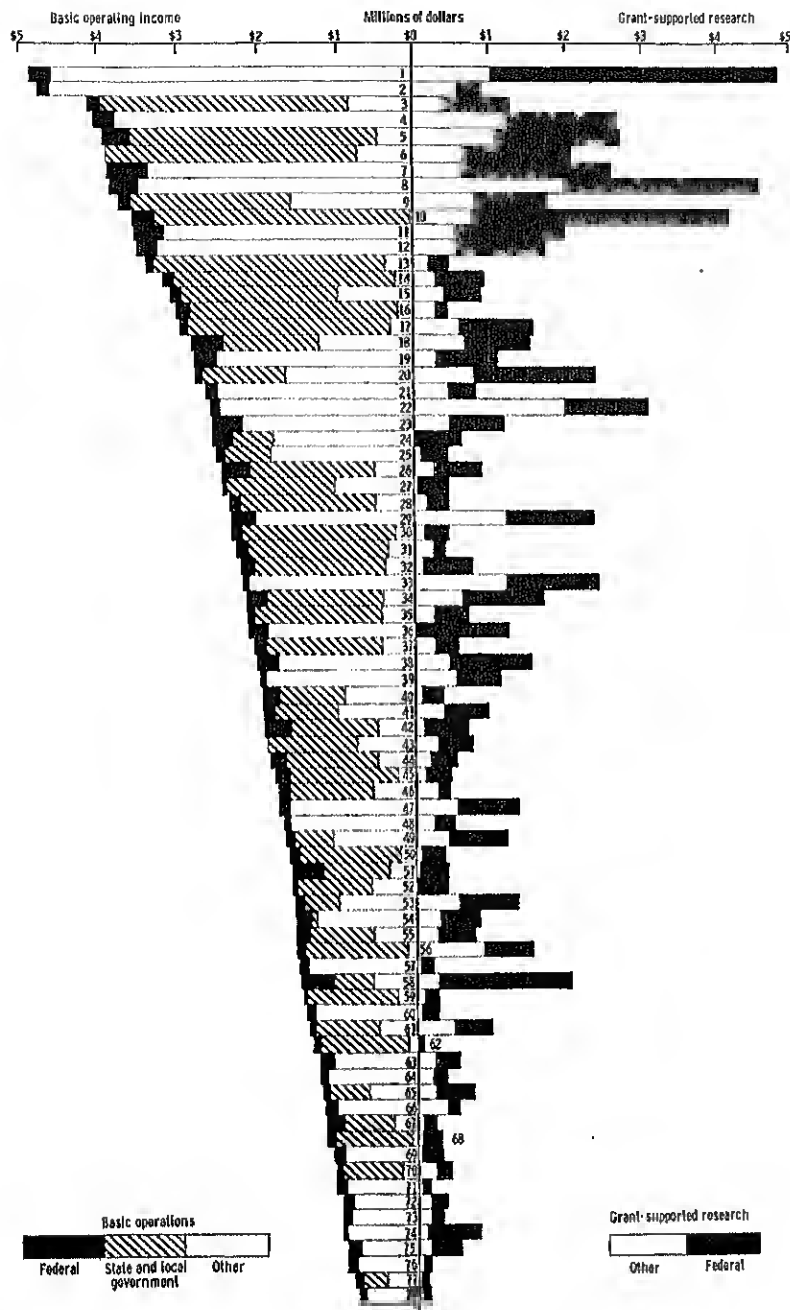
Medical schools vary so in their teaching, patient care, and research responsibilities that the simple inspection of total support does not permit reliable comparisons among individual schools. The purposes of this report will best be served, therefore, by separate consideration of basic operations and grant-supported research.²

Chart 15 shows the estimated 1958 expenditure of each of the 78 4-year medical schools which were in complete operation, ranked on the left according to their incomes for basic operations. On the right is shown the amount received for grant-supported research. Total expenditures range from just under \$900,000 to almost \$9 million, with a median of \$3 million. For basic operations the range is from \$750,000 to just under \$5 million, with a median of \$1.9 million. For grant-supported research the range is from \$83,000 to \$4.6 million with a median of \$762,000. Chart 16 shows similar data for public and private schools separately.

¹ Expenditures are for the academic year (1958 is the academic year 1957-58). These data were supplied by the schools to the American Medical Association in reply to a question designed by Mr. A. J. Carroll. The data presented here differ from those summarized in reference (4) principally because of an adjustment of \$8.6 million in the data for 1 school to exclude the cost of hospital operation.

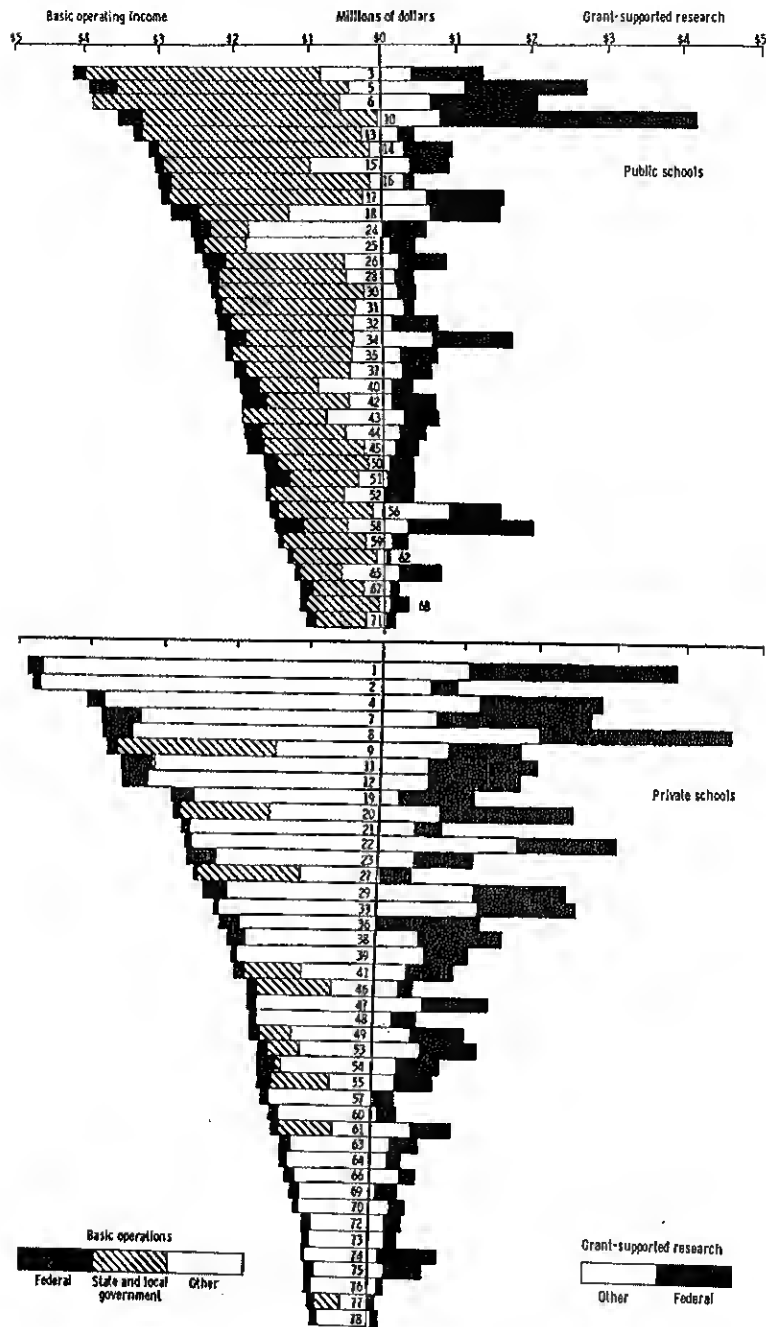
² Under a grant from the W. K. Kellogg Foundation, the Association of American Medical Colleges is conducting a comprehensive study of the costs of medical education. In spite of the diversity that exists among schools, this study is expected to clarify and compare the manner and extent to which their research, medical care, and educational programs are interrelated.

Chart 15. Sources of financial support
for each of 78 4-year medical schools: 1958



Source: Unpublished estimated data summarized in reference (4).

Chart 16. Sources of financial support for each of 36 public and 42 private 4-year medical schools: 1958



Source: Unpublished estimated data summarized in reference (4).

SUPPORT FOR BASIC OPERATIONS

The estimated \$176 million spent in 1958 for the basic operations of medical schools is more than three times the amount spent in 1948 (\$53 million) and six times the \$28 million spent in 1941 (table 12). Even when the expenditures for the earlier years are calculated in terms of 1958 dollars, the current expenses are almost triple those for 1948.

Basic operating expenses of the 45 private schools totalled some \$93 million in 1958, and of the 40 public schools \$83 million. State and local appropriations met 70 percent of the operating expenses of the public schools, while tuition and fees, gifts and grants, and Federal training funds each provided less than 10 percent. For the private schools

endowment income, tuition and fees, and reimbursement for patient care were the principal sources of operating income—together they met over half of the basic budget (table 13).

STATE AND LOCAL GOVERNMENTAL SUPPORT

In 1958 State and local governments contributed an estimated \$68 million³ to the support of medical school operations either directly or through the parent universities. In 1948 this support

³ Excluding tuition charges flowing directly to general funds.

Table 12. Basic operating expenses (excluding grant-supported research) of all medical schools in the United States: 1941-58

Source of support	1941 (millions)	1948 (millions)	Estimated 1958 (millions)
Current dollars:			
Total.....	\$27.8	\$53.5	\$176.3
State and local government support.....	5.2	18.0	67.5
Nongovernmental gifts and grants, endowment.....	10.1	11.7	32.7
Tuition and fees.....	9.0	12.1	22.8
Federal training grants.....		1.9	14.0
General university funds ¹	2.0	7.0	13.1
Reimbursement for patient care.....	(²)	(²)	18.8
All other.....	1.5	2.8	7.4
1958 dollars:			
Total.....	54.6	64.2	176.3
State and local government support.....	10.2	21.6	67.5
Nongovernmental gifts and grants, endowment.....	19.9	14.0	32.7
Tuition and fees.....	17.6	14.5	22.8
Federal training grants.....		2.3	14.0
General university funds ¹	3.9	8.4	13.1
Reimbursement for patient care.....	(²)	(²)	18.8
All other.....	3.0	3.4	7.4

¹ For private schools only. For public schools these funds are included with State and local government support.

² Not shown separately.

Source: Computed from reference (3) and unpublished data from study summarized in reference (4).

Table 13. Basic operating expenses (excluding grant-supported research) of 85 medical schools in the United States, by control of school: 1958

Source of funds ¹	AMOUNT (MILLIONS)		PERCENT DISTRIBUTION	
	Private schools	Public schools	Private schools	Public schools
Total	\$92.8	\$83.5	100	100
State and local government (f, g, pt. h, pt. n) ..	9.0	58.5	10	70
Tuition and fees (j)	15.7	7.1	17	9
Endowment (i)	16.6	0.9	18	1
Nongovernmental gifts and grants (d, e)	10.2	5.0	11	6
Federal training grants (c)	7.8	6.2	8	7
General university funds (pt. h, pt. n)	13.1	(²)	14	.....
Reimbursement for patient care (l, m)	15.7	3.1	17	4
All other (k, a)	4.7	2.7	5	3

¹ The letters refer to items in table 15 of reference (4).

² General university funds for the public schools have been included in State and local governmental support.

Source: Unpublished estimated data from study summarized in reference (4).

amounted to about \$18 million, and in 1941 to an estimated \$5 million. The osteopathic colleges received \$200,000 State and local governmental support in 1958.

The increased State and local governmental support has accompanied the expansion of 2-year programs to 4-year programs at five public schools, expansion of enrollments, the taking over by State governments of two private schools in New York and one in Texas, the establishment of new public medical schools in California, Florida, Washington, and Puerto Rico, and the increased support of a number of older public schools. There are now 40 publicly owned medical schools located in 33 States and Puerto Rico. A new school at the University of Kentucky will open in 1960. Five States ⁴ each have two State-supported medical schools. The city of Cincinnati has a municipally-supported medical school.

Over the Nation as a whole, State and local governmental funds constituted about 38 percent of the estimated basic operating budgets of the medical schools in 1958. For some public schools these funds amounted to almost 90 percent of the

basic operating budgets; in several, State contributions were less than 50 percent. Amounts ranged from about \$400,000 to more than \$3 million per school for the 4-year public medical schools. In addition to the 40 public medical schools, 11 private schools received State funds, some in substantial amounts.

State outlays for medical education are far from uniform, and far from uniformly related to the fiscal capacity of the States. Eight States each contributed amounts ranging from \$2 million to over \$6.5 million while 13 States and the District of Columbia did not contribute at all toward the operation of medical schools within their boundaries.

Mississippi, the State with the lowest per capita fiscal capacity in the Nation, spent \$1.2 million for medical school operation. Pennsylvania, the only State which makes substantial contributions to private schools, contributed over \$6 million in 1958 to the operation of the six privately owned medical schools and the one osteopathic college in the State.

The amount of State and local governmental support of medical schools in 1958 in relation to total personal income in each State is shown in chart 17.

⁴ These are: California, Michigan, New York, Texas, and Virginia.

The distribution of States by relative support was as follows:

Estimated State and local governmental support per \$1,000 personal income	Number of States
Total.....	48
40 cents or more.....	8
25-39 cents.....	11
Under 25 cents.....	20
None.....	9

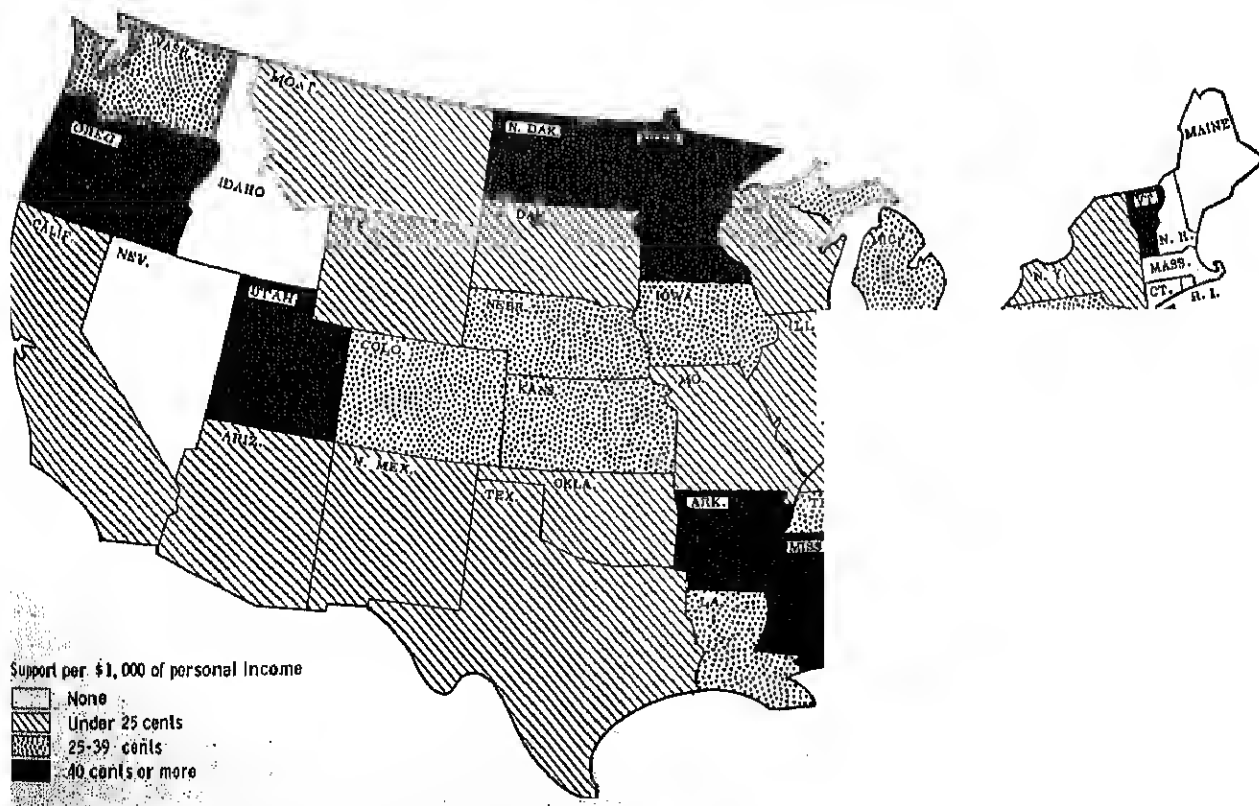
Source: Computed from unpublished data summarized in reference (4) and from reference (5). See also p. 73.

Some of the funds contributed to medical schools by State governments are channeled through regional education programs. States participating

in the programs of the Southern Regional Education Board and the Western Interstate Commission for Higher Education make contracts calling for payments to schools elsewhere within the region of \$2,000 a year for each of a specified number of students. The students in turn are not charged the additional fees which normally are paid by nonresidents. Under the medical plan of the New England Board of Higher Education, each New England medical school receives \$2,500 per year for each student it enrolls from a New England State in excess of the number enrolled from that State in 1956.

In the academic year 1958-59, the three regional education programs, which now involve 35 States, aided over 300 medical students, with payments totaling more than \$600,000. The contribution of these programs is indicated on the following page.

Chart 17. State and local governmental support of medical education per \$1,000 personal income: 1958



Source: Computed from unpublished estimated data summarized in ref

Program	Number of students	Contract payment per student	Total payments
Southern Regional Education Board.....	188	\$2,000	\$377,000
Western Interstate Commission for Higher Education.	94	2,000	188,000
New England Board of Higher Education.....	46	2,500	75,025

Source: References (6), (7), and (8).

GIFTS, GRANTS, AND ENDOWMENT INCOME

Medical school support from endowment income and nongovernmental gifts and grants has been increasing. For all medical schools combined such income has tripled since 1941:

Gifts, grants, and endowment	Thousands of dollars		
	1941	1948	Estimated 1958
Total	\$10,137	\$11,651	\$32,655
Nongovernmental gifts and grants.....	4,132	4,979	15,150
Endowment.....	6,005	6,672	17,505

Source: Reference (3) and unpublished data summarized in reference (4).

Increases in security prices, enlarged corporate earnings, and the marked rise in the interest rate have contributed to higher dollar income from endowments in recent years. Individual gifts for current support have also increased substantially.

The growth in endowment income, however, has not kept pace with the costs of education. In 1948 endowment income accounted for about 13 percent of the basic operating budgets of the medical schools, while in 1958 support from this source was only 10 percent.

The lack of uniformity in patterns of medical school support is illustrated by the uneven distribution of endowments, gifts and grants among schools. Thirteen 4-year medical schools received about one-half of the total endowment income and nongovernmental gifts and grants used for basic operations in 1958. The five schools with over \$1 million apiece accounted for over a third of the endowment income of all medical schools in the Nation.

A number of private organizations are working to improve the financial status of medical schools. The American Medical Education Foundation was established in 1951 as an instrument for physician and medical society support of the Nation's medical schools. Since its founding, \$7.9 million has been contributed to the medical schools through the Foundation. About \$1 million was distributed to medical schools from 1957 collections. Physicians contributed an additional \$3 million directly to medical schools during the year 1957, making a total that year of \$4 million in donations from physicians to medical schools (9).

The National Fund for Medical Education, also established in 1951, is sponsored by leaders in public affairs, business, industry, agriculture, labor, and higher education and by the American Medical Association and the Association of American Medical Colleges. The Fund concentrates on securing contributions from corporations and organized groups rather than from individuals. Awards of the National Fund for Medical Education are made to strengthen medical education. Grants for 1958 totaled \$3.1 million and were made on the following basis: A uniform sum of \$15,000 to each 4-year medical school, plus \$65 per undergraduate student; 2-year schools received \$7,500 each plus \$65 per student. Special grants amounting to about \$100,000 were made to 14 schools to help educators find ways to cope with teaching problems growing out of the rapid advancement of the medical sciences (10).

The support given to medical schools through these two groups and by individual physicians totalled about \$7.2 million in 1957-58. Most of this support was in the form of unrestricted grants. The schools find this unrestricted support especially helpful since it allows flexibility in program planning and operation.

The Osteopathic Progress Fund, established in 1943 as a cooperative fund-raising program of the

American Association of Osteopathic Colleges and the American Osteopathic Association, has raised in excess of \$6 million for budgetary support of osteopathic education. This Fund is currently producing well over \$700,000 per year of unrestricted financial aid for the six colleges (11).

Industries have donated funds for basic medical school support in addition to sums given for research. For example, the pharmaceutical manufacturers contributed about \$2 million in 1958 to such organizations as the National Fund for Medical Education and the American Foundation for Pharmaceutical Education (12). Insurance and other industries have also given substantial support.

Foundations have contributed substantially to medical education. Among the larger contributors are the Rockefeller Foundation, the Josiah Macy, Jr. Foundation, the John and Mary R. Markle Foundation, and the W. K. Kellogg Foundation. Recent grants by two other foundations are of such magnitude that they are of special interest.

The Ford Foundation, in 1955, appropriated \$90 million for endowment grants to privately supported medical schools to help strengthen their instruction. In 1956, \$500,000 was awarded to each of the 43 private 4-year medical schools and \$250,000 to the 2-year medical school at Dartmouth. These grants totaled approximately \$22 million. In 1957 the remainder of the \$90 million was awarded. In making these additional grants, the advisory committee considered certain quality factors and the committee's judgment with respect to these factors determined the recipient and the amount of the grants. Grants to individual medical schools for the 2-year period ranged from \$600,000 to \$3.6 million.

The terms of the grants provide that the principal is to be held as investment endowment for a period of 10 years, the income to be available for current instructional uses. The money may not be used for physical facilities or research. After the initial 10-year period, both principal and interest may be freely expended for purposes of medical education. It has been estimated that privately supported medical schools will together receive additional annual income of \$3.5 million to \$4.0 million from these grants. In addition, the Ford

Foundation granted \$10 million to match contributions collected by the National Fund for Medical Education over a 5 to 10 year period (13).

The Commonwealth Fund, which recently concentrated its activities in the field of medical education, appropriated \$12.6 million in unrestricted grants to 19 universities in 1956 to assist them in improving their programs of medical education (14).

While efforts to enlarge endowment income and current gift funds are heartening, the amount made available to the medical schools in this way falls far short of that required to meet the increased costs of expanded enrollments and the faculty salaries needed for a high quality of medical education.

TUITION AND FEES

Tuition and fees make up an important source of income in some medical schools, but overall they cover a declining proportion of operating expenses. For medical schools as a whole, tuition and fees in 1941 accounted for 32 percent of basic operating budgets; in 1948 for 23 percent; the percentage has now dropped to 13 percent.

Although total income from tuition and fees has declined in proportion to other sources of medical school income, the actual amounts in total and per medical student have increased sharply:

Year	Total (million)	Income from tuition and fees per student
1941.....	\$9.0	\$424
1948.....	12.1	547
1958 est.....	22.8	773

Source: Reference (3) and unpublished data summarized in reference (4).

In 1958 income from tuition and fees in the osteopathic colleges amounted to \$1.4 million or 21 percent of the amount spent for basic operations.

The importance of student charges as a source of funds differs considerably from school to school. In 1958, for example, there were still seven schools where such charges accounted for one-third or more of income for basic operations. In 10 schools they covered less than 5 percent of the basic oper-

ating budgets. In spite of the fact that student charges are higher in medical schools than in other professional schools, the proportion of operating expenses financed by this source is less in the medical schools than in other parts of the university.

REIMBURSEMENT FOR PATIENT CARE

Increasing amounts have recently been paid for the services of the medical school faculties for the part they play in the support of patient care. While Deitrick and Berson in their survey of 1953 (15) called attention to this source of income, the Carroll material summarized in (4) is the first to record it as a source of medical school income. The potential here is probably very great, particularly since third-party payment and other forms of medical care insurance are growing so rapidly in dollar volume. Since few schools have been in a position to study this aspect of their operations, it is possible that the actual dollar value of services which medical school faculties render to patients is far in excess of that reported.

Probably one of the most difficult problems of medical school financing is that related to the costs of medical care for the patients seen by medical students, interns, and the resident staff.

Historically, medical school teaching has been related to the care of charity patients. For these patients, the medical care was provided without cost to the patient by the teaching staff, the hospital house staff, and the students, while the hospital costs were borne by the hospital, with or without charity or public assistance. It has not been and still is not uncommon for universities and medical schools to subsidize teaching hospitals and clinics.

Today there are relatively fewer patients for whose costs the hospital receives no reimbursement. There are more public assistance recipients for whom welfare departments pay fixed amounts. Many low-income patients now have insurance for hospital costs and increasingly have insurance coverage for professional services, and thus enter hospitals as private rather than ward patients.

Nonpay patients, therefore, no longer suffice to provide the necessary teaching material in many schools, and increasing use is made of private patients for teaching purposes. This is true particularly in programs for the training of postgraduate medical students. In view of this situation, what are the credits and debits of the costs of clinical service for medical education?

There can be no doubt that the community benefits materially from the availability of the medical services related to medical school teaching and that much of this service is given to the community at a price which is less than its cost to the school. The financing of medical education would be considerably improved if the communities which receive this service were to provide more completely for its costs, both hospital and professional.

The growth of hospital and medical care insurance and prepayment for medical care has raised basic questions in the matter of the interrelated financing of hospital services and medical education.

Carroll, in a report to the State University of New York (16), said, "While medical college administrators think of medical care as a by-product of medical education, hospital administrators look at medical education as a by-product of medical care. The college will justify medical care expenditures as vital to its medical education programs; the teaching hospital will justify educational expenditures as essential to its medical care function. If guide lines for fair and proper allocations of costs between medical colleges and teaching hospitals are to be drawn up, a long, clear, and honest look at the problem is necessary."

Is a share of this money properly due to the resident physician who provides much of the direct care of the ward teaching patient? Should the medical school underwrite medical care costs? Can the fuller use of prepayment for professional fees for the patients of teaching hospitals aid materially in meeting the financial problems of medical schools?

The Consultant Group believes that answers to these questions must be found in the near future if medical education and the medical care aspects of that education are to find the proper balance that will benefit both the school and the medical care facility.

FEDERAL TEACHING AND TRAINING GRANTS

While no Federal program is designed specifically to aid the basic operation of medical schools, a number of Federal training grant programs directly or indirectly provide some support to basic operations.

In 1958 the medical schools received an estimated \$14 million in grants for training from all Federal sources. This accounted for almost 8 percent of total basic operating income. In 1948 less than \$2 million came from this source. The six osteopathic colleges received \$400,000 in Federal training grants in 1958.

The Public Health Service makes training grants through several channels. Undergraduate training grants are awarded by the National Cancer Institute, the National Heart Institute, and the National Institute of Mental Health. The maximum grant to a 4-year medical school under each of these programs is \$25,000 per year. Nearly every medical school in the Nation receives these grants. The Public Health Service also finances an experimental program for training undergraduate medical students in research methodology; grants are made under this program to universities seeking to

improve methods for training medical students for research careers. In addition, graduate training grants may be made by the various Institutes. These grants have no statutory maximum and may include funds for major equipment.

A study of 20 medical schools made recently by the National Institutes of Health showed that in those schools, 94 percent of all Federal training grants were from the Public Health Service (17). Other Federal agencies which make similar grants are the Department of Defense, the Atomic Energy Commission, and the Veterans Administration.

GENERAL UNIVERSITY FUNDS

Support from general university funds is of particular significance to the privately supported schools of medicine. The Reed Committee reported that in 1941 about \$2 million of the private schools' income came from general university sources; in 1948, about \$7 million (3). In 1958 about \$13 million came from this source (4). This use of general university funds may leave inadequate funds for the support of other university responsibilities. On the other hand, the effort of the medical school administration to raise funds on its own may clash with the efforts of the university.

GRANT-SUPPORTED RESEARCH

The rapid growth of grant-supported research has had wide effects on the organization and structure of medical education.

In 1958 the medical schools spent an estimated \$88 million for research financed by both Federal funds and non-Federal research grants (\$56 million of it Federal funds) and the osteopathic colleges received over \$200,000. The National Institutes of Health 20-school study showed that in those schools 80 percent of Federal research grant support was from the Public Health Service (17).

Funds for grant-supported research on the average amount to about 50 cents for each \$1 of basic operating funds. The growth of grant-supported

research is suggested by comparison with funds for this purpose in earlier years. In 1941, \$4 million and in 1948, \$17 million (equivalent to each \$1 of basic operating funds), were for research.

The wide variation among medical schools in the amount of money spent on grant-supported research is shown below:

Estimated expenditures for grant-supported research, 1958	Number of medical schools
Total.....	85
Less than \$500,000.....	34
\$500,000-\$999,999.....	21
\$1,000,000-\$1,999,999.....	18
\$2,000,000 or more.....	12

Source: Unpublished data summarized in reference (4).

The large scale grant-supported research activities of medical schools result in a diversion of funds from basic operations. Most grants, including those made by the Public Health Service, do not provide payments sufficient to meet the full indirect costs of research. As long as grant-supported research activities remained relatively small the schools were able to make up the difference out of general operating funds without too much difficulty. As the grant-supported research budgets have come to equal or in some cases exceed the budgets for all other activities, the medical schools have found it harder and harder to meet this problem. The 20 medical schools recently surveyed by the National Institutes of Health were in unanimous agreement that present allowances of the Public Health Service (a maximum of 15 percent) do not meet full indirect costs (18). "In schools with small research programs the reported indirect costs tend to be low. . . . As the research program grows and the cost accounting becomes more accurate, the identifiable indirect costs increase. The extent of variation between schools is large. Some indication of the variation can be inferred by a study of the indirect cost allowances

negotiated with the Department of Defense by these schools in accordance with the Armed Services Procurement Regulations. . . . Expressed as percent of direct cost, indirect costs varied between 12 percent and 31 percent with an average of 23 percent."

Data are not available on the total amount paid by various Federal and non-Federal agencies to the medical schools for indirect costs of research and training grants. However, in 1958 the 43 medical schools that reported indirect costs as a separate item showed a total of \$58.3 million in Federal and nongovernmental gifts and grants for research and training plus an additional \$4.6 million for indirect costs. This is 8 percent of the total gifts and grants. This amount falls far short of the average 23 percent mentioned above. If all agencies supporting research were to provide for the full cost thereof, the problems of medical schools in providing for basic operations would be materially lessened.

To meet the need of medical schools for fluid research funds with which to improve and stabilize rapidly growing research programs, it has been proposed that the Public Health Service establish a new program of institutional grants for research. In 1958, the Secretary's Consultants on Medical Research and Education (the Bayne-Jones group) said that it would be in the national interest to provide "base grants for research and training, distributed on the basis of professional judgments of the unique capacities and needs of each institution, and not made to finance specific projects or programs . . ." (19). More recently this proposal was endorsed by a National Institutes of Health Staff Committee on Support for Research and Training, which made the detailed study of the impact of research growth at 20 medical schools (18).

MEDICAL SCHOOL CONSTRUCTION

In earlier sections of this report the various components of the physical plant required by a medical school have been discussed. The medical school needs classrooms and laboratories, clinical teaching

facilities, and space for research. Other needs include a library and living quarters for the students. The problem of financing the construction of the chief among these facilities is discussed in

the present section under three headings: teaching hospital, research facilities, and teaching facilities. This is done with full awareness that it is impossible to draw a clear line between plant used for research and that used for teaching, or between either one of these types of facility and clinical teaching space.

TEACHING HOSPITALS

Funds for teaching hospitals have been drawn from a variety of sources, including private donors, State and local governments, and the Federal Government.

Private funds have been made available not only for the teaching hospitals of private medical schools but also, on occasion, for public schools. The University General Hospital at the State University of Iowa College of Medicine, for example, was constructed with Rockefeller Foundation funds matched by the State.

Since World War II the States have contributed importantly to teaching hospitals for new medical schools and also to the expansion and improvement of existing facilities. Among the new university hospitals built are those of the University of California at Los Angeles and at San Francisco, the University of Arkansas, the University of

Mississippi, the University of Florida, and Ohio State University.

The clinical facilities used by many medical schools are in public hospitals constructed by cities and counties. Among the new private schools, for example, Seton Hall uses the city-owned Jersey City Medical Center as its chief clinical teaching facility. City or county hospitals also are used by the Albert Einstein College of Medicine and the University of Miami.

The Federal Government has assisted in the construction of teaching hospitals through the Hospital and Medical Facilities Survey and Construction (Hill-Burton) Program. Since 1948 this program has contributed over \$100 million, or almost one-fifth of total project costs, for the construction of hospitals owned by or affiliated with medical schools (appendix table 11).

The costs of building teaching hospitals vary widely. Recent levels are in the range of \$14,000 to \$30,000 a bed, or from \$5 million to \$14 million for a 300- to 500-bed hospital (table 14).

RESEARCH FACILITIES

Private, State and local governmental, and Federal funds likewise have been used for the construction of medical school research facilities.

Table 14. Construction of teaching hospitals at selected medical schools

School	Year completed	Number of beds	Cost in millions	Cost per bed
Arkansas.....	1956	450	\$9.3	\$20,600
California, Los Angeles.....	1955	320	(1)	.....
California, San Francisco.....	1955	485	10.3	21,200
Florida.....	1958	400	10.2	25,500
Mississippi.....	1955	350	5.0	14,300
Missouri.....	1956	441	8.8	20,000
Oregon.....	1955	272	6.3	23,200
South Carolina.....	1955	382	10.8	28,300
Stanford.....	(2)	437	(2)	.....
West Virginia.....	(3)	471	14.2	30,100

¹ Cost of hospital and school together \$21 million.

² Cost of hospital and school together \$22 million.

³ Under construction.

Source: Compiled by the Division of Public Health Methods from various sources, principally, Journal American Medical Association and Journal Medical Education.

A few examples will illustrate the variety of sources of funds for research facilities. A drug firm, the National Foundation, and the Rockefeller Foundation furnished the equipment for a biochemistry and virus laboratory constructed by the State on the Berkeley campus of the University of California. At Emory University a \$2 million research center connected with the university hospital was made possible by grants from private donors and from the National Cancer Institute. At the University of Michigan a substantial gift from the Kresge Foundation made possible a new medical research building and a new medical library.

The Federal Research Facilities Construction Program has served as a catalyst to stimulate private and State and local contributions for research facilities construction. In the first 3 years of the program, medical schools, teaching hospitals, and other affiliated institutions received grants totaling \$86 million (appendix table 11). Matching on the average has considerably exceeded the \$1 for \$1 required by law, being closer to \$3 of institutional funds to each \$1 of Federal funds (20).

Sizeable research facility grants under the Research Facilities Construction Program have gone to new medical schools in process of development. About \$242,000 went to Albert Einstein for research facilities, \$147,000 to Seton Hall, \$1.4 million to

the University of Kentucky, \$556,000 to the University of Florida, and over \$1 million to the University of Miami.

Prior to the enactment of the Research Facilities Construction Program, the National Institutes of Health during 1948-50 made grants totaling almost \$20 million for the construction of cancer and heart research facilities (appendix table 11).

TEACHING FACILITIES

For funds to construct teaching facilities medical schools must rely on private and State and local governmental resources. While substantial Federal aid is available for construction of hospital and research facilities, there is no such support for the construction of teaching facilities—the base which is essential to both of these related activities. In the past 10 years, medical schools have spent more than \$180 million for such construction.

In recent years the cost of constructing a new basic medical science teaching plant, exclusive of hospital and research facilities, has averaged about \$8 million. Actual costs have varied widely, depending on such factors as the type of construction, the location of the school, the region of the country, and the extent to which the medical

Table 15. Construction of teaching facilities at selected medical schools

School	Year completed	Type of construction	Cost in millions
Arkansas.....	1957	Education building, including schools of nursing and pharmacy.	\$3.8
Albert Einstein.....	1956	Basic medical science building.....	11.0
Florida.....	1958	Medical science building, including school of nursing. ¹	6.3
Indiana.....	1958	Medical science building.....	7.5
Missouri.....	1957	Medical science building ¹	3.4
State University of N.Y., New York City.	1956	Medical science building.....	14.0
Southwestern.....	1955	Basic science building.....	2.9
Wayne.....	1954	Basic science building.....	4.3
West Virginia.....	1957	Basic science building ¹	12.0

¹ Includes equipment.

Source: Compiled by the Division of Public Health Methods from various sources, principally, Journal American Medical Association and Journal Medical Education.

school building houses other activities, such as schools of dentistry and nursing (table 15).

In the past 2 decades, changes in teaching programs and the proliferation of research activities have brought a crisis of obsolescence and over-

crowding in the physical facilities of existing medical schools. A recent survey showed a need for \$325 million for new construction and renovation of teaching facilities (not including research facilities and hospitals) (21).

SUMMARY

1. Fifty years ago the typical medical school was a small proprietary school supported by student fees. When public attention was drawn to the gross inadequacies of medical education, very substantial financial support began to come from foundations and other private sources and from universities. Financial support from State and local governmental funds also grew markedly. In the current decade the most significant change has been the growth of Federal grants for research and graduate training.

2. In 1958 the medical schools in the United States spent an estimated \$264 million for basic operations and grant-supported research, in contrast with \$71 million in 1948. Thus in a single decade expenditures more than tripled. Schools of osteopathy spent a total of \$7 million in 1958. The present range in medical school expenditures is from less than \$1 million to almost \$9 million.

3. Expenses for basic operations alone totaled an estimated \$176 million in 1958, in contrast to \$54 million in 1948. Since 1948 the amount received from tuition and fees has about doubled; gifts, grants and endowment income, and State and local funds have practically tripled. Another source of medical school support is being reported for the first time: the payment for services which the faculty is rendering to patients. The cost of these services, however, has not been entirely identified.

4. Basic operating expenses of the 40 public schools totaled some \$83 million in 1958, and of the 45 private schools \$93 million. State and local appropriations met 70 percent of the operating expenses of the public schools, while tuition and fees, gifts and grants, and Federal training

funds each provided less than 10 percent. For the private schools endowment income, tuition and fees, and reimbursement for patient care were the principal sources of operating income.

5. While efforts to enlarge endowment income and current gift funds are heartening, the amount made available to the medical schools in this way falls far short of that required to meet the increased costs of expanded enrollments and the faculty salaries needed for a high quality of education.

6. The recent growth in grant-supported research has been an outstanding development. From \$17 million in 1948, the support of this activity had grown to \$88 million by 1958, an increase of over 5-fold. Of this, \$56 million was a Federal government contribution. The median medical school expenditure for grant-supported research (from all sources) stands at \$762,000. The range is from \$83,000 to \$4.6 million. Reimbursement to the schools for the indirect costs of this research falls far short of meeting such costs. The effect is that universities are called on to support research at the cost of medical education.

7. Medical school construction has three major components—teaching facilities, the teaching hospital, and research facilities. Federal funds are now available on a matching basis for research facility construction, and some Federal aid for hospital construction is available under the Hospital and Medical Facilities Survey and Construction Program. However, the aid received by medical school hospitals has amounted to only a small part of recent teaching hospital construction costs. No Federal support is available for the construction of teaching facilities—the essential base for each of the others.

Chapter V

Planning the Expansion of Medical Education

To graduate 11,000 physicians a year by 1975, it will be necessary to have an increase of 3,600 over the present number of graduates. Expanding and planned programs will provide some 500 of this number by 1965. Three approaches are necessary to provide the balance of the needed additional graduates: 1) further expansion of enrollment in existing schools, 2) establishment of new programs of the basic medical sciences, and 3) establishment of new 4-year schools.

Of these approaches, the fastest would seem to be the expansion of existing schools. This has only

a limited potential, however, both because of the physical or other limitations of the schools themselves, and because of the lack, or relative lack, of existing schools in a number of geographic areas.

The establishment of a new program of basic medical sciences or a new 4-year school is a slow process, since the preparatory planning and construction may take from 2 to 6 years. This development must take place in a number of areas, however, if adequate educational opportunity is to become available. Careful planning for orderly expansion of the necessary magnitude is essential.

METHODS OF EXPANSION

EXPANSION OF ENROLLMENT IN EXISTING SCHOOLS

In the past 10 years most medical schools have increased enrollment substantially. In 1948 the 4-year schools had an average of 316 students; 10 years later these same schools averaged 381 students, a 20 percent increase. But a wide range in enrollment exists in medical schools today. At one extreme are Woman's Medical College, Vanderbilt, Vermont, Puerto Rico, and the University of California at Los Angeles, each with less than 200 students; and at the other, the Universities of Michigan and Tennessee, each with 750 or more students. The size of graduating classes ranges from 32 to 182 (appendix table 8).

Present schools have indicated that they could increase their first-year enrollment by 1,060 students if funds for necessary construction of facilities were

available. Some schools are now operating in hopelessly overcrowded, obsolete structures. For such schools any expansion is almost out of the question until the needs of the present number of students have been met. The replacement of obsolete structures and the addition of the facilities (exclusive of hospitals and research facilities) required for this expansion of 1,060 students will cost approximately \$325 million (1).

However, many schools in estimating their expansion potentials have been so concerned with the difficulties of staffing and financing that they have been reluctant to visualize more than modest increases. The educational programs of those of today's larger schools which have strong financing and faculties and good facilities do not suffer because of the size of their student bodies. Given the facilities, faculties, and operating funds many other schools could expand their educational capacity considerably.

NEW PROGRAMS OF THE BASIC MEDICAL SCIENCES

At the close of World War II there were eight schools which offered only the first 2 years of medical education. Upon completion of these programs the graduates transferred to other schools for the clinical years. Today four of these schools have built clinical facilities and expanded their programs to cover the full 4-year program, and a fifth¹ is in the process of so doing. With the decline in the number of basic science schools and the normal attrition in the first 2 years of the 4-year schools, today's 4-year schools find that they have an estimated 700 to 800 vacancies in the third year. Thus the graduates of eight or more new schools of the basic sciences could be placed in the clinical programs of existing 4-year schools.

The Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association are encouraging universities to establish such programs. Such a development might provide up to 800 first-year places.

For the institution that is considering the desirability and feasibility of adding medical education, beginning with the development of a basic medical science program may offer a number of advantages. Among them:

for a State to increase the educational opportunity for its citizens.

(5) The present number of openings in the clinical years of 4-year schools assures the placement of qualified upper-class students from additional 2-year schools, particularly if institutional planning to this end is undertaken.

(6) Once a 2-year program is well-established, it is possible to add the clinical program when needed. This has been the case with six schools in the past 20 years.

Much of the current experimentation with curriculum and teaching is directed towards the integration of the teaching of the classic basic medical sciences and the clinical subjects. Bringing into the 2-year curriculum the necessary aspects of clinical medicine is a real problem. The separation of the first and second halves of the medical course presents difficulties, but it should be possible to overcome these difficulties with careful planning and with the development of cooperative programs with 4-year schools.

LOCATION OF NEW MEDICAL SCHOOLS

A number of factors must be taken into account in determining the areas in which new medical schools might best be established. Important among them are: (1) an area's need for schools as measured by the need for practicing physicians and the lack of educational opportunity for young people; (2) an area's ability to support schools as measured by its fiscal capacity, its present support of medical education, and the availability of potential university bases for medical education. State-by-State analysis of most of these factors appears in appendix C.

This analysis suggests that seven States² might be warranted in establishing new medical schools both on the basis of need for a more equitable opportunity for medical education of their young people and also because their output of physicians is not adequate to assure them as much as an average supply of physicians.

Another nine States³ with small populations might meet similar situations by the development of regional schools, since singly they might have difficulty in providing adequate financing, in securing an adequate number of students, or in securing adequate clinical facilities. In four other States⁴ there is probably need for additional schools on the basis of lack of opportunity, although each of these States has an above average supply of physicians.

A number of other States have need for more medical educational opportunity. In these States, however, all or most of the need might be met by the expansion of existing schools.

The ability of the 20 States singly or in groups to support additional medical schools can be indi-

cated by pointing out that in none of these States would the cost in public money for providing the additional first-year places be as great in relation to total personal income as it now is in Arkansas and Vermont or as it will be in Kentucky, Mississippi, and West Virginia in a few years.

A medical school, if it is to have a strong educational base, must be related to a university which itself has adequate financial support and graduate programs in other academic areas. Present medical schools, with few exceptions, are affiliated with such universities.

Each of the areas which shows need for a medical school does have one or more universities without medical schools that meet these criteria. In some of the larger States, State universities which now have one or more medical schools offer the potential for the establishment of additional schools at the location of university branches.

While analysis of the national scene suggests areas which seem desirable locations for new schools, many factors enter into the decision as to location. These must be examined and weighed regionally or locally. Thus basic to the orderly development of the new medical education capacity of the United States is a broad foundation of planning. The importance of such planning by the medical schools and universities, communities and States, regional groups, national organizations, and the National Government itself, can hardly be over-emphasized. Without it the orderly development of the quality and quantity of medical education cannot be achieved.

PLANNING

Sound planning for medical education cannot be successfully accomplished without reference to

² Florida, Indiana, Michigan, New Jersey, Ohio, Texas, and Washington.

³ Maine, New Hampshire, Rhode Island, Arizona, Nevada, New Mexico, Idaho, Montana, and Wyoming.

⁴ California, Connecticut, Minnesota, and New York.

needs and resources in medicine and in related fields of education. It must take account of prospective requirements for different types of health services.

Machinery for planning medical education has taken many different forms. It has come from

the appointment of distinguished medical educators to review limited aspects of the educational program of an individual school to the establishment by interstate compact of a regional educational agency to give continuing review of all higher education needs in an area.

INSTITUTIONAL PLANNING

Appropriate coordination of medical education with education for related health professions and basic science specialties, and the balancing of medical school growth with the growth of other disciplines of the university will benefit all the students affected.

Planning at the institutional level has varied from almost none to comprehensive studies relating the medical school program not only to the programs of the parent university but also to the needs and resources of the community, the State, the region, the Nation, and even other parts of the world. An outstanding example of a comprehensive study is the Medical Center Study made by the University of Florida prior to the establishment of its new medical school at Gainesville, a study made possible by a substantial grant from the Commonwealth Fund (2).

STATE AND REGIONAL PLANNING

Public concern over medical service and educational opportunity has led to legislative study and action for the creation of medical schools in several States. In addition, during the past decade, various States have joined together for the purpose of planning on a regional basis for higher education. In the field of medical education, the outstanding programs of regional cooperation have been those of the Southern Regional Educational Board, the Western Interstate Commission on Higher Education, and the New England Board of Higher Education.

The administrative agencies of these compacts, which involve a total of 35 States, can undertake studies too broad in scope for any one institution or any one State. Because they must consider

manpower needs for each profession in terms of the larger framework of the total needs of a region, they have the opportunity of transcending the interests of any one professional group.

These regional agencies have conducted broad studies of training and research needs at the regional level in medicine and other health professions. They have been able to recommend the establishment of needed schools and to suggest general geographic locations for such schools.

Established by State action and operated with State funds, each agency is, in effect, an agency of each of the States party to the Compact under which it operates. At the same time representatives of the universities of the region play a major role in the determination of policy. Thus each agency represents both the interests of State governments and the interests of the universities.

Each of the three regional agencies operates a contract program for the education of medical students. Such programs could be used: (1) as a device for the expansion of some medical schools in each region through guarantees of income under student exchange contracts; and (2) as a means for relating new 2-year and 4-year schools.

State and regional planning for medical education need not introduce rigid uniformity in patterns of teaching, in composition of faculty, in type of students, in administrative organizations, or in methods of financing. It can rather help reduce unnecessary overlapping of costly specialized staff or facilities and enable individual universities to make the best use of their resources.

NATIONAL PLANNING

Planning for medical education at the national level has consisted primarily in the formulation of standards for medical teaching by appropriate voluntary associations. Leading examples of such standards are those published jointly by the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association. Planning through the Federal Government has been limited to the setting of standards in fields of activity only indirectly related to medical education, such as construction of hospital and medical facilities.

SUMMARY

1. To graduate 11,000 physicians a year by 1975, it will be necessary to have an increase of 3,600 over the present number of graduates. Expanding and planned programs will provide some 500 of this number by 1965. Three approaches are necessary to provide the balance:
 - (a) Further expansion of enrollment in existing schools,
 - (b) Establishment of new programs of basic medical sciences, and
 - (c) Establishment of new 4-year schools.
2. Expansion of enrollment in existing schools is the most expedient way to increase medical educational capacity in this country. However, even with substantial increases in enrollment, new programs of basic medical sciences and new 4-year schools will be needed.
3. In addition, shifts of population and the development of new urban centers will necessitate the founding of new medical schools more favorably located geographically.
4. From the national viewpoint, a number of factors must be taken into account in determining the general areas in which medical schools might best be established. Important among them are:
 - (a) The need of an area for schools as measured by its relative supply of physicians and opportunities for medical education of its young people.
 - (b) The ability of an area to support schools as measured by its fiscal capacity and its present public and private support of medical education.
5. A broad foundation of planning is essential for the development of the medical educational capacity of this country. Specific factors which enter into the decision on the location of a new basic science program or new medical school must be evaluated regionally and locally.
6. The necessary improvement and expansion of the Nation's medical education facilities will require planning at the institutional, local, State, regional, and national levels.

Chapter VI

Summary and Recommendations

A growing America will need more physicians. Over the next decade the population is expected to increase by more than 3.5 million a year, with growth proportionately greater among old people and children who require more medical care. Utilization of services is increasing as incomes and educational levels rise, more people have health insurance, more hospital beds are available, and there is wider understanding of the value of medical care. Aside from the need of our people for personal medical services, a continuing and increasing supply of physicians must also be assured for research, teaching, industry, public health, and other essential functions.

In 1959, there are in the United States approximately 249,000 doctors of medicine and osteopathy with a gross ratio of 141 physicians per 100,000 population. The ratio now is about the same as in 1940, with the highest ratios found in the Northeast and Pacific States and the lowest in the Southeast and Mountain States. To maintain the present ratio of physicians to population will require an increase in the graduates of schools of medicine and osteopathy from the present 7,400

to about 11,000 by 1975. This means a needed additional production of 3,600 graduates annually.

Of the 3,600 needed additional graduates, existing and planned schools will provide 500 by 1965. With adequate financing and construction aid, present schools could add about 1,000 graduates. New 2-year programs could add up to 800 first-year places for students who could then go to existing clinical places in 4-year schools. The balance of 1,000-1,500 graduates would need to come from new 4-year schools. This increase is equivalent to the output of 20-24 new 2-year and 4-year schools.

An increase in graduates sufficient to maintain the present ratio of physicians to population is a minimum essential to protect the health of the people of the United States. The Consultant Group is convinced that the problem is of such magnitude and concern that immediate concerted action by the Nation as a whole is imperative. Delay will serve only to increase the seriousness of the situation. The Consultants recommend the following program and urge the Surgeon General to assist in its implementation in every appropriate way.

SUPPORT OF STUDENTS

The number of medical graduates in the United States cannot be increased successfully unless the number of well-qualified medical school applicants is increased. Although the number of young people applying to medical schools probably will rise over the next decade, competition with related fields of specialization has grown and can be expected to increase in the future. One of the

principal obstacles to entering a medical career is the high cost to the student of the lengthy medical education.

Clearly the costs of 4 years of college, 4 years of medical school, and 1 to 6 years of internship and residency or fellowship training will occasion a considerable financial burden for many individuals and families. It is particularly difficult for the

student from a large family, or a family with a low income, to finance a medical education. Thus the opportunity for medical education is not equal for many young people of real talent.

Many medical students go into excessive debt in order to complete their 4 years of medical school. Large numbers of students must carry heavy outside work loads to finance their way through medical school, spending time that should go into study or research.

Existing scholarship and loan funds are inadequate. They do not meet the expressed need for such funds. They are conspicuously less in amount than the aid available to students in various related fields of specialization.

There is no shortage of talent in our society. But such talent is not being fully identified and used. Active efforts are required to encourage promising high school students with limited financial means to plan on studying medicine. Such students should be made to feel at an early stage that if they can gain admission to medical school, they will stand a reasonable chance of receiving the needed financial support.

In view of the facts that the expense of medical education is high (\$2,400 a year for unmarried students and \$3,300 for married), that medical education follows a 4-year college program, and that many students are married, both grant and loan programs are needed.

Some existing scholarship and loan programs require obligated service, such as practice for a period of years in a rural area or the rendering of some other specified medical service. Such commitments for service may prevent the young physician from entering promptly the type of practice for which he is best suited.

The newly established Federal student loan program under the National Defense Education Act of 1958, as currently conducted, will be of only minor help in relieving the present shortage of low-cost loan funds for medical students, even if adequate appropriations were to be made for this program and if medical schools were to make the fullest possible use of the funds available.

Already such Federal agencies as the Office of Education, the Public Health Service, the National Science Foundation, and the Atomic Energy Com-

mission offer generous fellowships to graduate students in physical sciences, life sciences, a social sciences. Comparable assistance is not available for medical students. The Federal Government has as much stake in promoting medical education as in fostering the development of scientists and teachers. In time of emergency the Nation calls upon its physicians for unusual service. There is no question of the need for Federal support of educational loans and grants for medical students.

Despite the high cost of a medical education about one-fifth of the students come from families with incomes of less than \$5,000. Young people from low-income families, however, are at a serious economic disadvantage. The proportion of students from higher income families, already large has increased in recent years.

To relieve some of the financial pressure on students in medical schools, to give greater equality of opportunity to talented young people, to encourage young people to plan for a career in medicine at an earlier age, and to assure an adequate supply of physicians, the Nation must increase the availability of loans and scholarships to medical students.

Specifically the Consultant Group Recommends:

1. Aggressive action should be initiated by foundations, individuals, industry, and voluntary agencies to obtain additional private support of medical students, including both low-cost loans and scholarships for persons who otherwise would be unable to finance a medical education.
2. States not already having such programs should make educational loans and grants or scholarships to selected medical students, in such amount and according to such criteria as each State may provide.

3. The Federal Government should establish educational grants-in-aid for medical students on the basis of merit and need, similar in value and proportionate in number to grants now made to graduate students in other fields of specialization. These educational grants should be available to students so that they could attend a medical school any place in the United States.

4. The Office of Education in administering its program of student loans under the National Defense Education Act should give special consideration to the needs of institutions having medical schools, in order that medical students may receive loans in proportion to their urgent needs for assistance. Medical schools should make special efforts to participate in this program.

THE MEDICAL SCHOOL

To meet the emerging need for an increased number of physicians, there must be enough schools of medicine to accommodate the needed number of qualified students.

Efforts to increase the number of medical graduates must be accompanied by vigilance in safeguarding and improving the quality of medical education. The recommendations of the Consultant Group are for the establishment of only well-based, well-supported institutions. The need is for schools that can give leadership and inspiration in facing the medical problems of the future.

Since the early years of the century, medical schools in the United States have developed from institutions offering primarily classroom instruction to complex centers of undergraduate and graduate education, research, and clinical service. At present the United States has 85 schools of medicine, 81 of them offering the full 4-year program and 4 of them only the first 2 years. In addition there are six colleges of osteopathy.

Slightly more than half of the 85 medical schools and all of the colleges of osteopathy are privately controlled. Recent years have seen a more rapid increase in the number of public than of private schools. Nine States still have no medical school, and four other States are without a 4-year school. Enrollment in 4-year medical schools ranges from 179 to 768 with an average of 370.

From the viewpoint of society the responsibilities of the medical school can be expressed in broad

terms: to provide the opportunity for a medical education to qualified young people, and to supply the physicians needed for medical services, teaching, and research. The medical school also provides graduate education for interns and residents, and postgraduate education for physicians. In addition it may provide training for Ph.D. candidates and other professional students. Its hospital frequently serves as a medical referral center for a State or region.

The 2-year programs of basic medical sciences can make an important contribution in increasing the opportunities for preclinical education and thereby allowing more efficient use of existing clinical training facilities for third- and fourth-year students. The school of basic medical sciences has a particular problem—that of organizing its program so as to coordinate its preclinical education with clinical training provided in another location. These organizational problems can and should be overcome.

Medical schools have characteristics which differ according to the needs they must serve. However, there is a certain basic general pattern. The medical school should have:

- (1) A curriculum that incorporates new knowledge without being overcrowded or excessively long,
- (2) A faculty of adequate size, with a firm base of full-time faculty members,

- (3) Well-equipped classroom and laboratory facilities, with space for research,
- (4) An adequate library,
- (5) A strong university affiliation,
- (6) A student body of high caliber,
- (7) A teaching hospital closely associated with the medical school, and
- (8) Adequate continuing financial support.

With the increasing complexity of medical knowledge and indeed of all science, the problems of curriculum content and length of medical training are of increasing importance, both from the viewpoint of the student and in terms of the cost of medical education. Critical and objective review of teaching methodology, curriculum construction, and class size to determine the most effective and economical means of obtaining high quality medical education is urgently and continuously needed.

Medical education requires liberal ratios of faculty to students, with laboratory and small-group teaching stressed in preclinical subjects and with clinical clerkships and bedside teaching emphasized in the last 2 years. Increasingly, schools are finding that each department must have at least a core of full-time teachers, with volunteers used primarily to enrich and diversify the program.

Facilities required by a medical school include classrooms and laboratories, a library, administrative offices, an auditorium, space for research, and adequate patients and clinical facilities.

As the literature of medicine has grown in amount and complexity, the medical school library assumes an increasingly significant role in the educational and research programs of the school. The library must have comprehensive reference material and periodical files.

To achieve its maximum potentialities a medical school should be an integral part of a university. The physical proximity of the university and the medical school is of increasing importance as medicine is becoming more and more involved in research in the physical and social sciences. Advantages of such proximity have generated support for placing medical schools in the same community

as the university, if adequate clinical material can be assured.

Most of the public medical schools and some of the private schools give preference in admission to students who live in the State in which the school is located. Such restrictions are imposed to assure opportunities for medical education to students from a particular State or group of States. Too rigid application of this policy may prevent the school from choosing the best qualified applicants or from selecting a student body with desirably diverse backgrounds and interests.

Two-thirds of the public medical schools have teaching hospitals owned either by the school or by the parent university. Private schools make greater use of hospitals which, while closely integrated or affiliated with the schools, are not owned by them.

A number of schools are in a difficult financial plight. Today a school with an undergraduate enrollment of 400, and with a minimum adequate faculty, needs a basic operating budget of some \$1.5 million if it is properly to meet its educational responsibility.

To overcome the deficiencies in existing schools, as well as to assure the sound development of new schools, there must be broader public and professional understanding of the requirements of a good medical school, in terms which can be converted readily into budgetary requirements. With this kind of information the governing bodies of medical schools will be in a much stronger position to bring their needs to the sympathetic attention of potential supporters.

Specifically the Consultant Group Recommends:

1. Public agencies as well as private individuals and organizations interested in increasing the Nation's supply of physicians should see that such increases are made in a manner which protects the quality of medical education.

2. New medical schools should be established only with the type of faculty, facilities (including the teaching hospitals), financing, and university affiliation that will allow them to carry out a satisfactory educational program for a well-qualified student body.

3. Schools providing education in the basic medical sciences should meet the same educational standards as 4-year medical schools, and give special attention to problems of coordinating the program for the first 2 years with subsequent clinical training opportunities.

4. Greater attention must be given to the problems of existing schools whose educational plants or programs are now inadequately financed.

5. Schools should consider the effect of unreasonably restrictive admission policies on the quality of their students and the need for a student body with diversified interests and background.

6. There must be continuing appraisal of the length and content of the medical curriculum, including evaluation of experiments being made to shorten the period of training.

FINANCING MEDICAL EDUCATION

Recent years have seen marked growth in the responsibilities and the financial support and problems of medical schools. In 1958 the medical schools in the United States spent an estimated total of \$264 million, in contrast to \$71 million in 1948 and \$32 million in 1941. Of the 1958 total, \$176 million was for basic operations and \$88 million for grant-supported research. Individual school budgets ranged from just under \$900,000 to almost \$9 million.

In the early part of the present century, medical schools were financed primarily from tuition and fees. Public attention to the poor condition of medical education brought forth substantial support from foundations and private philanthropists.

In the 1940's the greatest change in the pattern of support was the increase in the contributions of State governments, both through increased support of existing schools and the establishment of new schools. In the current decade, the growth in research, with substantial Federal support, has been the outstanding feature in the financing of medical schools. What is the outlook for the financing of medical education in the future? The

costs of basic operations, research, and construction are considered separately.

BASIC OPERATING EXPENDITURES

In 1958 the medical schools in the United States had total basic operating expenditures of an estimated \$176 million. Individual schools are operating on budgets ranging from \$750,000 to \$5 million a year (exclusive of grant-supported research). Of the \$176 million for basic operating expense, \$93 million represents the budgets of the 45 private schools, and \$83 million that of the 40 public schools. State and local appropriations met 70 percent of the operating expenses of the public schools, while tuition and fees, gifts and grants, and Federal training funds each provided less than 10 percent. For the private schools, endowment income, tuition and fees, and reimbursement for patient care were the principal sources of operating income—together they met over half of the basic budget.

GRANT-SUPPORTED RESEARCH

The recent growth in grant-supported research has been an outstanding development. From less than \$4 million in 1941, the support of this activity has grown to \$88 million by 1958. Of this, \$56 million was the Federal Government contribution (primarily grants from the Public Health Service). There is a very wide range in the size of the grant-supported research programs of individual schools. The smallest program in 1958 was approximately \$57,000, the largest \$4.6 million.

Most research grants do not provide a payment sufficient to meet the indirect costs of research. Many schools find the burden of such costs a strain on their already overtaxed basic operating funds. Payments for full indirect costs would go far toward eliminating (within the individual institution) the inequities and pressures that have been created by the impact of the Federal research programs.

NEED FOR BETTER SUPPORT OF OPERATIONS AND RESEARCH

The medical schools have a diversity of financial resources potentially available to them. The responsibility, therefore, for the basic operations of the individual school optimally should continue to rest with its educational sponsors—public and private. Although some schools are now in a serious financial situation, the Consultant Group was unable to find a satisfactory way in which Federal aid could be secured for the support of the operations of these schools. The Consultant Group gave consideration to ways in which the financial structure of medical education might be strengthened:

1. *State and city governments.*—Those States contributing nothing or relatively little to the support of medical education should meet their share of this total responsibility.

2. *Universities.*—Medical school support should be provided in such a manner and from such sources

that the medical school complements the other academic responsibilities of the parent university.

3. *Endowment.*—While increases have been substantial over the past decade they have not been sufficient to carry the previous share of the burden. Significant efforts are needed to increase endowment in order to provide stability in the medical school program.

4. *Tuition.*—Tuition in medical schools is at such a level that it cannot be expected to become a larger proportion of the medical school income.

5. *Gifts and grants for basic operations.*—Income from these sources should be increased significantly to preserve the proper balance between the various sources of medical school income.

6. *Reimbursement for the care of patients by faculty members.*—The cost of care of indigents should not be charged to the medical school budget. Medical schools should be reimbursed for or relieved of the expense of professional services rendered by the faculty.

7. *Reimbursement for the costs of grant-supported research.*—The growing magnitude of sponsored research requires full reimbursement for indirect costs, to protect the basic operations of schools of medicine.

8. *Federal Government.*—The continuation of training grants, the payment of full indirect costs for research, and the development of Federal institutional research grants which would make possible greater stability and flexibility of research, would seem to be the best contributions of the Federal Government at this time.

CONSTRUCTION OF FACILITIES

Probably the greatest immediate obstacle to expanding the Nation's medical educational capacity in existing schools and in the development of new schools is the problem of financing the needed physical facilities. In addition, many schools are beset by problems of attempting to carry out

teaching activities in overcrowded and obsolescent buildings, despite the considerable construction activity which has taken place in recent years. A program to meet the accumulated needs is urgently required.

The basic sciences building is the first and central facility required by a medical school. This building may also house schools for other health professions, such as dentistry and nursing. The cost of recently constructed new teaching facilities has averaged \$8 million, varying with such factors as the scope of the program, the size of the student body, and the part of the country in which the construction is undertaken. At the present time, no Federal funds are available for construction of teaching facilities.

Many of the new medical schools of the next decade can be expected to require the construction of teaching hospitals. Recently constructed teaching hospitals having from 300 to 500 beds have cost between \$5 and \$14 million per hospital. The Federal Government has supported the construction of teaching hospitals under the Hospital and Medical Facilities Survey and Construction Act (Hill-Burton program). However, the primary purpose of that legislation is to provide for hospitals in areas away from larger medical centers, giving special consideration to hospitals serving rural communities and areas with relatively small financial resources.

Although there has been much construction of research facilities, aided considerably through the Medical Research Facilities Construction Act, the need for additional medical school research facilities continues at a high level.

The Consultant Group is convinced that the Nation's physician supply will continue to lag behind needs created by increasing population unless the Federal Government makes an emergency financial contribution on a matching basis toward the construction of medical school facilities. Only with such a Federal stimulus will adequate funds be available for needed construction.

The Federal Government has rightly recognized the importance of construction of medical research hospital facilities, and has made substantial contributions to these areas. The teaching program, which is basic to both, has been left out.

To increase the supply of physicians and to safeguard and protect the Nation's investment in research and medical care facilities, Federal support should be given to the construction of medical school facilities.

Specifically the Consultant Group Recommends:

1. *Basic operating expenses.*—There should be more generous public and private support for the basic operations of medical schools. This support must come from many sources, including State and local appropriations, endowments, gifts and grants, universities, and reimbursement for patient care.

2. *Research.*—Research grants to medical schools should cover full indirect costs, so that medical schools are properly reimbursed for the contribution of medical education to medical research. The Consultants strongly concur with the Secretary's Consultants on Medical Research and Education (the Bayne-Jones group) in endorsing the need for institutional grants.

3. *Construction.*—The Federal Government over a period of the next 10 years should appropriate funds on a matching basis to meet construction needs for medical education, which include: expanding and improving existing schools, construction of new schools of basic medical sciences, construction of new 4-year medical schools, and construction of the necessary teaching hospitals.

Programs for the construction of teaching, research, and clinical facilities should

operate within a common administrative framework in order to ensure proper balance in the planning and construction of facilities, uniformity of administrative methodology and practice, and proper coordination.

PLANNING

The needed expansion of existing schools, the development of new 2-year programs, and the establishment of new 4-year schools will require a sound base of planning. It is the opinion of the Consultant Group that expansion of existing facilities to their fullest potential is the quickest, most economical, and most expedient way to begin. The development of needed new schools will also require serious study with respect to location, placement, financing, and program.

How does a new medical school start? Each situation is unique. In some areas the impetus has come from a recognized need for more physicians, in others from a demand for greater educational opportunity for the young people of a State or area. Some schools have begun because of a philanthropist's interest in research. With such differences in motivation have come differences in development, structure, financing, and objectives of the schools.

A number of factors must be taken into account in determining the areas in which and the conditions under which medical schools might best be established or expanded. Among these are:

- (1) The need of the area for schools, as measured by its relative supply of physicians, and by the relative opportunity for medical education of its young people.
- (2) The ability of the area to support schools, as measured by its fiscal capacity, its present support of medical education, the presence in the area of potential university bases for a medical school, and the presence or potentiality of adequate clinical facilities.

The necessary improvement and expansion of the Nation's medical education facilities will require sound planning in relation to the needs and capacities of regions, States, localities, and institutions. Much planning already is under way. Some medical schools are looking ahead to larger and enriched programs. Some States have made careful and critical studies of the need for medical care and for medical educational opportunity for their people. In three sections of the country, States have banded together in cooperative programs for the advancement of general and professional education.

The Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association can be of assistance to any group that is exploring the establishment of a new school. Among the materials available, the Association of American Medical Colleges has prepared an outline for the phasing of a new school which indicates planning and developmental priorities. This outline appears as appendix B in this report.

There has been excellent documentation of many aspects of new school development in recent years. Of particular note are studies in relation to the State University of New York in 1948 (1), the University of North Carolina in 1947 (2), and the University of Florida in 1954 (3).

Specifically The Consultant Group Recommends:

1. Existing medical schools should make every effort to increase enrollment.

consistent with the maintenance of good educational programs.

2. States that are now without a planning group on higher education should develop such a group, with planning for medical education as a function, or with separate subgroups for medical education. The planning group should include representation from existing public and private schools. It should explore the expansion of existing schools, the possible establishment of 2-year as well as of 4-year schools, and the development of agreements for placement of the third- and fourth-year students from 2-year programs.

3. In carrying out the planning func-

tion, States should be encouraged to develop interstate cooperation. For the smaller States, with limited clinical facilities and small tax bases, there are substantial advantages in developing regional rather than State medical schools.

4. When Federal funds become available to aid medical education, a National Committee should be established to advise the Surgeon General on the administration of such funds. The work of the group should be closely coordinated with that of the National Advisory Council on Health Research Facilities and the Federal Hospital Council which are concerned with administering Federal grants for research facilities and hospital construction.

RELATED HEALTH PROFESSIONS

The charge to this Consultant Group was to consider the needs in the field of medical education. It is necessary, however, to associate the problems of medicine with those of the related health professions. Physicians cannot carry their load of responsibility without competent and well-trained teammates and associates.

There is increasing recognition of the inter-related responsibility of health workers with a variety of skills and educational preparations. One evidence of this is the development of university-based health centers with closely related schools of medicine, dentistry, nursing, and other health professions.

The growth of the allied health professions has had profound effects on the patterns and availability of medical care. In 1900, for every physician in practice there was one other professional health practitioner; today, there are four such persons for every physician.

There are shortages of trained people in practically every one of the many professional and technical careers in the health field. Intensive recruitment of young people for these many essential health services, including medicine, is imperative. The work of the National Health Careers Commission of the National Health Council and of State and local health careers committees should be encouraged and strengthened. Professional organizations should augment their efforts to recruit young people

**Specifically the Consultant Group
Recommends:**

1. The Surgeon General should establish a consultant group or groups to study the educational needs in the health professions related to medicine.

2. National, State and local professional and civic organizations should develop and conduct active programs for recruitment of qualified candidates for medicine and for all other careers in health services.

Appendix A

Dentists for a Growing America

TRENDS IN SUPPLY

Increases in dentist supply have been lagging behind population growth for more than a quarter of a century. In 1930, when there were fewer than 75,000 dentists,¹ the United States had 59 dentists for every 100,000 persons in the population. Today, with nearly 100,000 dentists, there are only 56 per 100,000 persons. The number of dentists actively serving the civilian population has fallen from 58 to 46 per 100,000 persons over this period.

The dental profession's own successful efforts to raise dental education standards during the 1920's reduced training capacity substantially as substandard schools were eliminated. With the depression and then World War II following close upon this action, little of the lost capacity was recovered. Since the war, however, the number of students in school has shown large and sustained increases and, with improved methods of student selection, substantially more of those enrolled go on to graduate. The number of schools has risen from 39 at the end of the war to 47 today, and enrollments stand at twice their immediate post-war level. Yet dental schools are still not producing enough new dentists to pace population growth. Even with the expansion now planned, they will not graduate a sufficient number to halt the downtrend in supply.

At current projected levels of school output, the number of graduates will grow from about 3,100 in 1958 to nearly 3,500 in 1964. Unless there are further increases, however, the total dentist supply will reach only 118,000 in 1975. If the population grows at the rate projected, this number by 1975 will be equivalent to only 50 dentists per 100,000 persons. The ratio of active civilian den-

tists to civilian population will also decline, to 43 per 100,000 persons.

FUTURE NEEDS

To meet only the needs associated with population growth will require a total of 134,000 dentists in 1975. Of this number, an estimated 8,500 will be needed for government service and another 4,000 to meet what are probably the minimum requirements for teaching and research. Staffing these activities and, more important, staffing them with first-rate personnel may prove extremely difficult. At the present time, dental schools almost uniformly report pressing problems in faculty recruitment and retention. To a disturbingly large degree, faculty positions—and especially those at entry levels—are filled by practitioners who devote a few hours a week to part-time teaching. Strengthening the dental faculty by building up a full complement of permanent full-time members, with adequate opportunities for research and experimentation, should, therefore, have high priority. The present shortage of research and teaching personnel impedes efforts to expand basic research and limits the activity of dental schools largely to that of training general practitioners. Even the training of practitioners may be hampered unless larger numbers of students can be channelled into teaching.

After allowing for retirements, the number of dentists left for practice in 1975 will total only 96,000. This is about 15,000 fewer than are needed

dentists annually. This is about 2,700 more graduates than are currently in prospect and will require a 75 percent increase in training capacity.

APPLICANTS

Although dentistry has enjoyed considerable popularity as a career choice in the post-war period, the number of applicants has dropped from slightly more than 2 for every available dental school space to slightly less than 2 today. With college enrollments climbing rapidly there is every likelihood that the current decline will be overcome and that future applications will steadily increase. Yet, like medicine, dentistry must increasingly compete with other disciplines for students who possess the necessary aptitudes and intelligence for pursuing a professional education.

Not only are the costs of attending dental school high but the financial support available to assist the student is extremely limited. And, while the dental student need not look forward to years of internship and residency, he faces the necessity of making a very large investment in equipment during his first years in practice when his earnings are low.

COST OF DENTAL EDUCATION TO THE STUDENT

The relatively high cost of attending dental school was shown in a survey of dental students attending school during the 1953-54 school year. The average single student living away from home spent nearly \$10,500 for his 4 years of dental school training—\$10,800 if he attended a private school and \$9,200 if he attended a public school. For the typical married student, expenses averaged \$14,500. By the 1956-57 school year, tuition and fees had risen about 12 percent and living costs had also edged up slightly, bringing the average cost for the single student to an estimated \$11,000 in that year and the cost for the married student to \$15,000.

SOURCES OF STUDENT FINANCIAL SUPPORT

Most of the funds needed to finance a dental education came from sources within the student's own family. The married student relied most heavily on his wife's earnings and the single student on funds supplied by his parents. In neither case was the student himself able to meet much more than a quarter of his expenses from his own earnings and the savings accrued from vacation employment and other sources.

For the student who received such aid, scholarships and loans which met roughly 15 percent of his total annual expenses may have provided the necessary margin of support for remaining in school. However, only 1 student in 12 had a scholarship and 1 in 25 a school loan. In the aggregate, funds received from these two sources met only 1.2 percent and 0.6 percent, respectively, of the average annual cost of attending dental school.

Almost three-fifths of all dental students went into debt to attend dental school and many were deeply in debt by the time they were graduated. The average debt per student increased from \$2,200 to \$4,250 between the end of the student's first year in school and his graduation. For nearly a third of those incurring debts the amount owed at graduation exceeded \$6,000.

RESPONSIBILITIES AND FUNCTIONS OF SCHOOLS

Because the dental school has as its ultimate goal the protection and improvement of national oral health standards, its professional obligations are not limited to the training of undergraduate students. It must—and does—conduct research programs to discover the nature of dental diseases and to develop better methods of treatment and prevention. To do this, it must also train research specialists. It trains many of the auxiliary personnel dentistry requires to increase the availability of dental services. It must conduct continual programs of curriculum evaluation and revision.

so that the training it provides will reflect the latest advances in technology.

On the postgraduate level, the dental school must offer refresher courses, special seminars, and regular postgraduate training to dentists already in practice, and it must provide graduate training to the future teacher and the specialist. It must also meet its responsibilities to the community through the operation of its own clinics or in those of the medical centers many schools and cities now operate as a method of meeting the total health needs of the individual citizen.

NUMBER AND LOCATION OF EXISTING SCHOOLS

The United States today has 47 dental schools located in 27 States and the Commonwealth of Puerto Rico. The number of schools and first-year places in relation to population by geographic division are shown below:

Division	Number of schools	1st-year places per 100,000 population
New England.....	2	1.2
Middle Atlantic.....	8	2.2
South Atlantic.....	7	2.0
East South Central.....	4	2.1
West South Central.....	3	1.5
East North Central.....	9	2.3
West North Central.....	7	3.0
Mountain.....	.....	.....
Pacific.....	6	2.4

FINANCIAL SUPPORT FOR BASIC OPERATIONS

Largely because of expanding enrollments and the increasingly broadened scope of dental school activities, dental school expenditures have more than doubled in less than a decade, rising to more than \$38 million in 1959. As in medical schools, however, the per student cost of providing undergraduate instruction has advanced steadily while the share of that cost borne by the student has

as steadily declined. But dental schools remain more dependent upon income from this source—now about \$10.5 million—than medical schools. Student charges still cover more than a quarter of dental school operating expenses. Clinic income—about \$6.5 million—another traditional source of dental school funds, also continues to meet a significant, though steadily declining, share of dental school costs, accounting for a fifth (17 percent) at the present time. Little private support has come to the aid of the dental school. Gifts, grants, and direct income from endowments are negligible. In fact, medical schools receive \$75 in endowment income for every \$1 that dental schools get from this source. Nearly all the dental school budget which is not met by clinic income and student fees is financed by public appropriations and university transfers.

FINANCIAL SUPPORT FOR CONSTRUCTION

From \$5 to \$10 million has been spent annually for dental school construction in recent years, including the amounts spent on improvement and expansion of existing schools. The total amount spent over the past 10 years has exceeded \$60 million. In all, nearly 1,100 freshman places have been added to the Nation's dental school capacity since World War II, 750 of them in existing schools. All 14 of the public schools and 19 of the 25 private schools that were in existence at the start of the war have expanded their first-year classes, the majority by 25 percent or more. About 55 percent of this expansion in existing schools occurred in public schools, nearly 30 percent of it in three public schools which more than doubled their enrollment during the postwar period. In addition, seven new dental schools have enrolled students. Four of these are public institutions constructed with public funds.

MEETING FUTURE NEEDS

To arrest the decline in the national ratio dentists to population at its 1959 level will requ

that dental school training capacity be increased sufficiently to produce 6,180 annual graduates by 1975, or about 2,700 more than can now be expected.

Expansion is especially needed in areas of the country where future population growth will outpace projected gains in dentist supply. The divisions facing the largest deficits on this basis are the Middle Atlantic, East North Central, and Pacific. Dentist gains in New England and the West North Central divisions will also fall short of the number needed to maintain their current ratios. On the other hand, the South and the Mountain States are now gaining dentists at a rate which will permit some improvement in ratios. The South, however, is currently the least well-supplied of all regions; and the Mountain region, although once again gaining, had until recently lost ground steadily since its one school closed 30 years ago.

Population needs could probably be best served

if the 2,700 additional graduates were distributed in this way: East North Central, 600; Pacific, 570; South Atlantic, 365; Middle Atlantic, 350; West North Central, 350; West South Central, 200; Mountain, 140; New England, 100; and East South Central, 30.

Despite the large building program of the postwar years, many existing schools are still housed in overcrowded facilities while others are rapidly approaching obsolescence. For this reason, modernization of the existing school plant is of first importance. The schools themselves expect to undertake nearly a \$46.5 million modernization program within the next 5 years and current reports indicate that, with another \$50 million in construction funds, they could expand enrollment sufficiently to provide 500 of the 2,700 graduates needed. This would leave 2,200 graduates to be accommodated in new schools. To build and equip 22 new schools accommodating 100 students in each class would cost approximately \$132 million.

Appendix B

Development of New Medical Schools

PHASE 1.

- A. Determination of need
- B. Determination of resources
- C. Determination of location
- D. Minimum essentials necessary before the employment of a dean
- E. Other considerations

PHASE 2.

- A. Employment of dean
- B. Planning staff
- C. Building estimates
- D. Source of financing; capital funds and operating funds
- E. Administrative structure
- F. Other considerations

PHASE 3.

- A. Faculty employment
- B. Curriculum plan; educational, service and research objectives
- C. Library development
- D. Approval of final plans and building schedules
- E. Final development of clinical affiliated facilities
- F. Other considerations

PHASE 4.

- A. Acceptance of the first class
- B. The first 4 years
- C. Accreditation
- D. Graduate and postgraduate
- E. Other consideration

Source: Prepared by an *ad hoc* committee of the Association of American

Appendix C

Location of New Medical Schools

EDUCATIONAL OPPORTUNITY

In the Nation as a whole, 4.2 young people enter medical schools and colleges of osteopathy a year for each 1,000 young people age 20. The range among the States is from 1.1 to 6.5. Probably most important among the factors that produce this variation is the opportunity for medical education in the State.

Two measures seem to have enough general validity to serve as basic indicators of opportunity for students:

- (a) The ratio of first-year medical school places in a State to bachelor's degrees granted, and
- (b) The extent to which the State is a debtor to other States in the provision of medical education for its young people.

These together provide a standard against which a State can measure its opportunity for medical education:

- (a) The extent to which the State meets the national average of 25 first-year places for each 1,000 bachelor's degrees granted. (Thirty-one States have a lower ratio—appendix table 1.)
- (b) The balance between first-year places in the State and the number of residents in first-year places in all schools. (Twenty-nine States have more residents in first-year classes than first-year places in the State—appendix table 1.)

An approximate minimum requirement for each State can be obtained by averaging the number of first-year places needed to provide 25 places per 1,000 bachelor's degrees granted and the number of State residents enrolled in first-year classes in any State. To set the requirement for 1970, this average was adjusted by the expected population change to that year (appendix table 1a).

Bringing all States up to the present national average medical educational opportunity would mean the creation by 1970 of nearly 3,000 new first-year places for the residents of 37 States.

If 65 to 150 students is taken as a size range for first-year class, 11 of these States will have a potential for one or more additional schools, the groups of 3 States each will have the potential for regional schools, and 16 States will have small needs which might be met by expansion of existing schools or by regional or other arrangements. The remaining State plans to open a new school in 1960.

NEED FOR PRACTICING PHYSICIANS

A low ratio of physicians to population in a State strongly suggests a need for added medical education facilities. The average ratio for the United States is 126 active non-Federal physicians (M.D. and D.O.) per 100,000 civilian population.

Of the States with a deficit of medical education opportunity, all but eight now have below average physician-population ratios. And of these eight it can be expected that four will fall below the average by 1970 unless there is substantial migration of physicians to these States (appendix table 2).

FINANCIAL CAPACITY

The ability of a State to provide financial support for a medical school can be indicated by the general fiscal capacity of the State. Although this is especially true for a public school, all the private schools established in the past decade have been in high-income States.

For the United States there are 25 first-year students enrolled in medical schools and colleges of osteopathy for each billion dollars of personal

income. The variation among the States is from 0 to over 80 first-year students per billion dollars:

First-year medical students in State per billion dollars personal income, 1958	Number of States
Total.....	48
0.....	9
Less than 20.....	10
20-39.....	19
40 and over.....	10

Source: Computed from references (1) and (5).

Appendix table 3 shows this ratio for each State together with the estimated ratios for 1970 on the basis of the needed additional first-year places shown in appendix table 1a. The last column of the table shows the ratio of needed first-year places per billion dollars of personal income.

STATE AND LOCAL GOVERNMENTAL SUPPORT

In 1957-58 State and local governmental support for medical education was given by 39 States.¹

¹ Four Western States with no medical schools contributed \$2,000 a student per year towards the support of a small number of students in schools in other Western States. The contribution of these States was estimated from the 1958 report of the Western Interstate Commission for Higher Education.

The contributions of the 39 States ranged from 1 cent to \$1.06 per \$1,000 personal income. For the 34 States with public medical schools the average was 23 cents. Of the 20 States which singly or in groups have student potentials for new schools, 17 are now providing less than 25 cents per \$1,000 personal income for support of medical education.

State and local governmental support per \$1,000 personal income, 1958	Number of States	
	Total	With potential for new schools
Total.....	48	20
40 cents or more.....	8	1
25-39 cents.....	11	2
Less than 25 cents.....	20	10
None.....	9	7

Source: Computed from unpublished data summarized in reference (1) and from reference (5).

If the suggested new schools were to receive public financial support at the present average rate of public support (\$4,000 per student per year), in none of the 20 States would the cost in public money per \$1,000 of personal income be as great as it is now in Arkansas and Vermont or as it will be in Kentucky, Mississippi, and West Virginia in a few years.

Appendix D

Tables

Appendix table 1. First-year places in medical schools and colleges of osteopathy per 1,000 bachelor's degrees granted and balance of first-year places by State: 1958

Division and State	1st-year places per 1,000 bachelor's degrees granted	Balance of 1st-year places ¹	Division and State	1st-year places per 1,000 bachelor's degrees granted	Balance of 1st-year places ¹
United States . . .	25		East North Central:		
New England:			Illinois	36	+203
Connecticut	17	-25	Indiana	15	-32
Maine		-18	Michigan	19	-101
New Hampshire	14	-12	Ohio	20	-136
Rhode Island		-31	Wisconsin	26	+29
Massachusetts	19	+84			
Vermont	41	+25	West North Central:		
Middle Atlantic:			Iowa	34	+35
New Jersey	12	-263	Kansas	18	-16
New York	29	-101	Minnesota	17	-35
Pennsylvania	36	+115	Missouri	59	+322
South Atlantic:			Nebraska	49	+31
Delaware		-18	North Dakota	31	-7
District of Columbia	92	+252	South Dakota	28	+8
Florida	21	-58			
Georgia	30	+4	Mountain:		
Maryland	37	+51	Arizona		-38
North Carolina	25	+41	Nevada		-3
South Carolina	19	-23	New Mexico		-21
Virginia	30	0	Idaho		-24
West Virginia	13	-31	Montana		-26
East South Central:			Wyoming		-18
Alabama	13	-35	Colorado	18	0
Kentucky	20	-15	Utah	18	-5
Mississippi	21	-44			
Tennessee	50	+114	Pacific:		
West South Central:			California	20	-88
Arkansas	33	-14	Oregon	20	-10
Louisiana	42	+108	Washington	12	-20
Oklahoma	16	-43			
Texas	18	-32			

¹ Numbers with a plus sign indicate excess of first-year places in State over State residents in first-year classes. Numbers with a minus sign indicate deficit of first-year places in State compared with State residents in first-year classes.
Source: Computed by Division of Public Health Methods.

Appendix table 1a. First-year places in medical schools and colleges of osteopathy needed in each State on basis of student potential: 1958 and 1970 estimate

Division and State	1ST-YEAR PLACES IN STATE 1958				Percent change in total population to 1970	1ST-YEAR PLACES NEEDED 1970		New schools needed ¹
	Actual	Total needed to provide—		Average of A and B		Total	In addition to present number	
		A 25 per 1,000 bachelor's degrees granted	B Places for residents in 1st year class					
United States.....	8,530						2,968	21
New England:								
Connecticut.....	79	120	104	112	+29	144	65	1
Maine.....		42	18	30	(²)	30	30	1
New Hampshire.....	24	44	22	33	+16	38	14	
Rhode Island.....		48	31	40	+7	43	43	
Massachusetts.....	302	398	218	308	+16	357	55	
Vermont.....	51	31	26	28	+2	29		
Middle Atlantic:								
New Jersey.....	80	160	343	252	+27	320	240	2
New York.....	1,021	889	1,122	1,006	+27	1,278	257	2
Pennsylvania.....	787	546	672	609	+17	713		
South Atlantic:								
Delaware.....		11	18	14	+40	20	20	
District of Columbia.....	312	85	60	72	+28	92		
Florida.....	130	155	188	172	+44	248	118	1
Georgia.....	177	147	173	160	+16	186	9	
Maryland.....	167	114	116	115	+41	162		
North Carolina.....	202	204	161	182	+18	215	13	
South Carolina.....	80	104	103	104	+22	127	47	
Virginia.....	162	137	162	150	+17	176	14	
West Virginia.....	40	77	71	74	+5	78	38	
East South Central:								
Alabama.....	81	151	116	134	+6	142	61	
Kentucky.....	103	126	118	122	+7	131	28	
Mississippi.....	80	97	124	110	-5	105	25	
Tennessee.....	346	173	232	202	+16	235		
West South Central:								
Arkansas.....	93	71	107	89	-17	74		
Louisiana.....	259	153	151	152	+24	188		
Oklahoma.....	100	154	143	148	-4	142	42	
Texas.....	322	447	354	400	+31	524	202	

See footnotes at end of table.

Appendix table 1a. First-year places in medical schools and colleges of osteopathy needed in each State on basis of student potential: 1958 and 1970 estimate—Continued

Division and State	1ST-YEAR PLACES IN STATE 1958				Percent change in total population to 1970	1ST-YEAR PLACES NEEDED 1970		New schools needed ¹
	Actual	Total needed to provide—		Average of A and B		Total	In addition to present number	
		A 25 per 1,000 bachelor's degrees granted	B Places for residents in 1st year class					
East North Central:								
Illinois.....	626	430	423	426	+20	511		
Indiana.....	158	268	190	229	+30	297	139	1
Michigan.....	281	361	382	372	+40	521	240	2
Ohio.....	325	402	461	432	+37	592	267	2
Wisconsin.....	195	191	166	178	+22	217	22	
West North Central:								
Iowa.....	202	150	167	159	+6	169		
Kansas.....	102	140	118	129	+22	157	55	
Minnesota.....	131	191	166	178	+19	212	81	1
Missouri.....	491	207	169	188	+20	226		
Nebraska.....	164	84	103	94	+14	107		
North Dakota.....	40	32	47	40	+13	45	5	
South Dakota.....	46	41	38	40	+15	46		
Mountain:								
Arizona.....		54	38	46	+72	79	79	
Nevada.....		6	3	4	+77	7	7	1
New Mexico.....		31	21	26	+42	37	37	
Idaho.....		26	24	25	+11	28	28	
Montana.....		32	26	29	+15	33	33	1
Wyoming.....		13	18	16	+23	20	20	
Colorado.....	85	119	85	102	+36	139	54	
Utah.....	58	80	63	72	+41	102	44	
Pacific:								
California.....	474	604	562	583	+50	874	400	3
Oregon.....	79	101	89	95	+36	130	51	
Washington.....	75	151	95	123	+30	160	85	1

¹ On basis of 65 to 150 students per 1st-year class.

² Less than 0.5 percent.

Source: Computed by Division of Public Health Methods.

Appendix table 2. Active non-Federal physicians (M.D. and D.O.) per 100,000 civilian population: 1957 and 1970 estimate

Division and State	Physician-population ratio		Division and State	Physician-population ratio	
	1957	1970 ¹		1957	1970 ¹
United States.....	126	119	East North Central:		
New England:			Illinois.....	125	139
Connecticut.....	168	127	Indiana.....	97	85
Maine.....	120	86	Michigan.....	120	95
Massachusetts.....	180	182	Ohio.....	123	97
New Hampshire.....	129	80	Wisconsin.....	102	112
Rhode Island.....	129	85	West North Central:		
Vermont.....	144	252	Iowa.....	109	144
Middle Atlantic:			Kansas.....	112	116
New Jersey.....	124	81	Minnesota.....	126	115
New York.....	188	166	Missouri.....	134	188
Pennsylvania.....	139	162	Nebraska.....	106	189
South Atlantic:			North Dakota.....	74	48
Delaware.....	121	62	South Dakota.....	75	47
District of Columbia.....	290	501	Mountain:		
Florida.....	107	75	Arizona.....	100	42
Georgia.....	88	102	Nevada.....	104	42
Maryland.....	128	115	New Mexico.....	88	44
North Carolina.....	88	99	Idaho.....	90	58
South Carolina.....	71	75	Montana.....	96	61
Virginia.....	96	102	Wyoming.....	83	49
West Virginia.....	87	75	Colorado.....	149	122
East South Central:			Utah.....	119	118
Alabama.....	72	77	Pacific:		
Kentucky.....	84	112	California.....	164	105
Mississippi.....	69	95	Oregon.....	123	105
Tennessee.....	99	163	Washington.....	122	92
West South Central:					
Arkansas.....	84	145			
Louisiana.....	109	143			
Oklahoma.....	109	135			
Texas.....	100	87			

¹ Number of physicians (M.D. and D.O.) estimated at present levels of graduation assuming no migration of physicians from State of graduation, and no immigration of graduates of foreign schools.

Source: Computed by Division of Public Health Methods.

Appendix table 3. First-year places in medical schools and colleges of osteopathy in each State in relation to personal income: 1958 and 1970 estimate

Division and State	Personal Income 1957 (in millions)	1ST-YEAR PLACES IN STATE, 1958		Estimated personal income 1970 ¹ (in millions)	TOTAL 1ST-YEAR PLACES NEEDED IN STATE, 1970	
		Number	Per billion dollars personal income		Number ²	Per billion dollars personal income
United States.....	\$345,272	8,530	25	\$433,662		
New England:						
Connecticut.....	6,352	79	12	8,213	144	18
Maine.....	1,568			1,570	30	19
Massachusetts.....	11,361	302	27	13,213	357	27
New Hampshire.....	1,065	24	23	1,236	38	31
Rhode Island.....	1,715			1,838	43	23
Vermont.....	626	51	81	640	(³)	(³)
Middle Atlantic:						
New Jersey.....	14,089	80	6	17,865	320	18
New York.....	40,954	1,021	25	52,093	1,278	24
Pennsylvania.....	23,327	787	34	27,199	(³)	(³)
South Atlantic:						
Delaware.....	1,200			1,684	20	12
Dist. of Columbia.....	2,089	312	149	2,680	(³)	(³)
Florida.....	7,522	130	17	10,839	248	23
Georgia.....	5,407	177	33	6,250	186	30
Maryland.....	6,242	167	27	8,782	(³)	(³)
North Carolina.....	5,924	202	34	7,002	215	31
South Carolina.....	2,796	80	29	3,403	127	37
Virginia.....	6,302	162	26	7,367	176	24
West Virginia.....	3,071	40	13	3,234	78	24
East South Central:						
Alabama.....	4,171	81	19	4,430	142	32
Kentucky.....	4,172	103	25	4,464	131	29
Mississippi.....	2,093	80	38	1,982	105	53
Tennessee.....	4,791	346	72	5,543	(³)	(³)
West South Central:						
Arkansas.....	2,035	93	46	1,685	(³)	(³)
Louisiana.....	4,804	259	54	5,943	(³)	(³)
Oklahoma.....	3,687	100	27	3,540	142	40
Texas.....	16,364	322	20	21,502	524	24

See footnotes at end of table.

Appendix table 3. First-year places in medical schools and colleges of osteopathy in each State in relation to personal income: 1958 and 1970 estimate—Continued

Division and State	Personal income 1957 (in millions)	1ST-YEAR PLACES IN STATE, 1958		Estimated personal income 1970 ¹ (in millions)	TOTAL 1ST-YEAR PLACES NEEDED IN STATE, 1970	
		Number	Per billion dollars personal income		Number ²	Per billion dollars personal income ³
East North Central:						
Illinois.....	23,579	626	27	28,318	(³)	(³)
Indiana.....	9,110	158	17	11,852	297	25
Michigan.....	16,706	281	17	23,322	521	22
Ohio.....	20,748	325	16	28,342	592	21
Wisconsin.....	7,416	195	26	9,077	217	24
West North Central:						
Iowa.....	5,056	202	40	5,359	(³)	(³)
Kansas.....	3,817	102	27	4,657	157	34
Minnesota.....	6,145	131	21	7,331	212	29
Missouri.....	8,256	491	59	9,907	(³)	(³)
Nebraska.....	2,640	164	62	2,999	(³)	(³)
North Dakota.....	924	40	43	1,044	45	43
South Dakota.....	1,075	46	43	1,235	(³)	(³)
Mountain:						
Arizona.....	1,988			3,409	79	23
Nevada.....	647			1,148	7	6
New Mexico.....	1,399			1,989	37	19
Idaho.....	1,043			1,161	28	24
Montana.....	1,263			1,459	33	23
Wyoming.....	644			790	20	25
Colorado.....	3,339	85	26	4,528	139	31
Utah.....	1,442	58	40	2,027	102	50
Pacific:						
California.....	35,131	474	13	52,732	874	16
Oregon.....	3,385	79	23	4,617	130	28
Washington.....	5,792	75	13	7,547	160	21

¹ State fiscal capacity in 1970 estimated on basis of 1957 capacity adjusted for change in population between 1957 and 1970. Since no increased productivity has been assumed these are conservative estimates.

² See appendix table 1a for method of calculating places needed.

³ 1957 first year places higher than minimum computed need for 1970.

Source: Computed by Division of Public Health Methods.

Appendix table 4. Number of active non-Federal physicians (M.D. and D.O.) and ratio to population, by division and State: 1957

Division and State	NUMBER OF ACTIVE NON-FEDERAL PHYSICIANS			RATE PER 100,000 CIVILIAN POPULATION		
	Total	Doctors of medicine	Doctors of osteopathy	Total	Doctors of medicine	Doctors of osteopathy
United States.....	212,078	199,366	12,712	126.0	118.4	7.6
New England.....	15,819	15,104	715	162.8	155.4	7.4
Connecticut.....	3,787	3,722	65	167.8	164.9	2.9
Maine.....	1,103	889	214	119.5	96.3	23.2
Massachusetts.....	8,602	8,303	299	180.2	173.9	6.3
New Hampshire.....	732	704	28	129.3	124.4	4.9
Rhode Island.....	1,065	991	74	128.6	119.7	8.9
Vermont.....	530	495	35	144.0	134.5	9.5
Middle Atlantic.....	52,489	50,344	2,145	160.7	154.1	6.6
New Jersey.....	6,912	6,530	382	124.1	117.2	6.9
New York.....	30,308	29,833	475	188.3	185.3	3.0
Pennsylvania.....	15,269	13,981	1,288	138.9	127.2	11.7
South Atlantic.....	24,843	24,139	704	102.7	99.8	2.9
Delaware.....	517	490	27	121.3	115.0	6.3
District of Columbia.....	2,311	2,293	18	289.6	287.3	2.3
Florida.....	4,418	4,043	375	107.4	98.3	9.1
Georgia.....	3,253	3,177	76	88.1	86.1	2.0
Maryland.....	3,615	3,593	22	127.7	127.0	0.7
North Carolina.....	3,867	3,834	33	88.1	87.4	0.7
South Carolina.....	1,651	1,643	8	71.4	71.1	0.3
Virginia.....	3,502	3,471	31	95.6	94.7	0.9
West Virginia.....	1,709	1,595	114	87.1	81.3	5.8
East South Central.....	9,641	9,520	121	82.3	81.3	1.0
Alabama.....	2,251	2,247	4	71.8	71.7	0.1
Kentucky.....	2,511	2,469	42	83.6	82.2	1.4
Mississippi.....	1,493	1,488	5	69.4	69.2	0.2
Tennessee.....	3,386	3,316	70	98.9	96.9	2.0
West South Central.....	16,134	15,074	1,060	100.9	94.3	6.6
Arkansas.....	1,470	1,445	25	83.6	82.2	1.4
Louisiana.....	3,295	3,281	14	109.0	108.6	0.4
Oklahoma.....	2,414	2,041	373	108.7	91.9	16.8
Texas.....	8,955	8,307	648	99.6	92.4	7.2

Appendix table 4. Number of active non-Federal physicians (M.D. and D.O.) and ratio to population, by division and State: 1957—Continued

Division and State	NUMBER OF ACTIVE NON-FEDERAL PHYSICIANS			RATE PER 100,000 CIVILIAN POPULATION		
	Total	Doctors of medicine	Doctors of osteopathy	Total	Doctors of medicine	Doctors of osteopathy
East North Central.....	40,963	38,087	2,876	117.5	109.2	8.2
Illinois.....	12,092	11,734	358	125.3	121.6	3.7
Indiana.....	4,346	4,170	176	96.6	92.7	3.9
Michigan.....	9,263	7,862	1,401	120.4	102.2	18.2
Ohio.....	11,329	10,548	781	123.3	114.8	8.5
Wisconsin.....	3,933	3,773	160	102.0	97.9	4.1
West North Central.....	17,664	15,666	1,998	116.8	103.6	13.2
Iowa.....	3,030	2,574	456	109.0	92.6	16.4
Kansas.....	2,304	2,108	196	111.9	102.4	9.5
Minnesota.....	4,167	4,085	82	125.8	123.3	2.5
Missouri.....	5,657	4,516	1,141	134.4	107.3	27.1
Nebraska.....	1,916	1,454	62	106.5	102.1	4.4
North Dakota.....	474	460	14	73.6	71.4	2.2
South Dakota.....	516	469	47	75.1	68.3	6.8
Mountain.....	6,906	6,330	576	111.9	102.6	9.3
Arizona.....	1,053	949	104	100.0	90.1	9.9
Nevada.....	264	236	28	104.3	93.3	11.0
New Mexico.....	691	585	106	87.6	74.1	13.5
Idaho.....	574	533	41	89.7	83.3	6.4
Montana.....	642	595	47	96.4	89.3	7.1
Wyoming.....	258	242	16	83.2	78.0	5.2
Colorado.....	2,425	2,211	214	149.3	136.1	13.2
Utah.....	999	979	20	119.5	117.1	2.4
Pacific.....	27,619	25,102	2,517	153.9	139.9	14.0
California.....	22,231	20,019	2,212	164.0	147.7	16.3
Oregon.....	2,144	2,007	137	123.3	115.4	7.9
Washington.....	3,244	3,076	168	122.3	115.9	6.4

Sources: 1958 A.M.A. Directory corrected from punch cards furnished by A.M.A. and A Statistical Study of the Osteopathic Profession, Dec. 1, 1957.

Appendix table 5. Non-Federal physicians (M.D.) per 100,000 civilian population, by division: 1931-57

Division	1931	1940	1949	1957
United States.....	123.2	129.4	127.9	¹ 124.7
New England.....	140.0	159.0	159.8	164.1
Middle Atlantic.....	138.6	167.1	165.3	159.6
South Atlantic.....	101.5	101.6	105.4	107.8
East South Central.....	94.7	83.2	82.1	85.1
West South Central.....	103.6	100.7	100.4	99.1
East North Central.....	127.4	130.9	121.8	113.5
West North Central.....	124.0	121.1	118.0	108.7
Mountain.....	113.5	112.0	117.2	110.9
Pacific.....	152.3	152.9	149.6	151.7

¹ This rate differs from that shown in appendix table 4. It includes data for retired physicians which are not available by State for the earlier years.

Source: U.S. Department of Health, Education, and Welfare, Public Health Service, Division of Public Health Methods, Health Manpower Source Book; Section 9, Physicians, Dentists, and Professional Nurses. Public Health Service Pub. No. 263, Washington, U.S. Government Printing Office, 1959, 79 pp.

Appendix table 6. Number of physicians (M.D.) in the United States and ratio to population, by type of practice: 1931-57

Type of practice	1931	1940	1949	1957
NUMBER OF PHYSICIANS				
Total.....	156,406	175,163	201,277	226,625
Private practice.....	134,274	142,939	150,417	155,827
General practice and part-time specialty..	112,116	109,272	95,526	81,443
Full-time specialty.....	22,158	33,667	54,891	74,384
Not in private practice.....	16,151	22,351	41,160	60,137
Hospital service.....	9,700	14,209	24,887	36,371
Teaching, research, public health ¹	2,900	3,349	3,737	7,168
Federal Government.....	3,551	4,793	12,536	16,598
Retired.....	5,981	9,873	9,700	10,661
PHYSICIANS PER 100,000 POPULATION				
Total.....	126.0	132.6	134.9	132.4
Private practice.....	108.2	108.2	100.8	91.1
General practice and part-time specialty..	90.3	82.7	64.0	47.6
Full-time specialty.....	17.9	25.5	36.8	43.5
Not in private practice.....	13.0	16.9	27.6	35.1
Hospital service.....	7.8	10.8	16.7	21.2
Teaching, research, public health.....	2.3	2.5	2.5	4.2
Federal Government.....	2.9	3.6	8.4	9.7
Retired.....	4.8	7.5	6.5	6.2

¹ Includes also industrial and insurance medicine and other nonprivate practice.

Source: U.S. Department of Health, Education, and Welfare, Public Health Service, Division of Public Health Methods. Health Manpower Source Book, Section 9, Physicians, Dentists, and Professional Nurses. Public Health Service Pub. No. 263, Washington, U.S. Government Printing Office, 1959, 79 pp.

Appendix table 7. Family physician potential (M.D.) in the United States and ratios to population, 1931-57

Type of practice	1931	1940	1949	1957
NUMBER OF PHYSICIANS				
Total physicians	156,406	175,163	201,277	226,625
Family physician potential ¹	117,079	117,386	110,236	101,973
Pediatrics ²	1,396	2,222	3,787	5,876
Internal medicine ²	3,567	5,892	10,923	14,654
General practice and part-time specialty ..	112,116	109,272	95,526	81,443
All others	39,327	57,777	91,041	124,652
PHYSICIANS PER 100,000 CIVILIAN POPULATION				
Family physician potential	94	89	75	60
Pediatrics	1	2	3	3
Internal medicine	3	4	7	9
General practice and part-time specialty ..	90	83	65	48
PERCENT OF TOTAL PHYSICIANS				
Family physician potential	75	67	55	45
Pediatrics	1	1	2	3
Internal medicine	2	3	5	6
General practice and part-time specialty ..	72	63	48	36

¹ Includes only physicians in private practice.

² Estimated from total number of limited specialists in specialty.

Sources: Pennell, Maryland Y., and Altenderfer, Morlon E. Health Manpower Source Book, Section 1, Physicians, Preliminary. Public Health Service Pub. No. 263, Washington, U.S. Government Printing Office, 1952, 70 pp.
U.S. Department of Health, Education, and Welfare, Public Health Service, Division of Public Health Methods. Health Manpower Source Book, Section 9, Physicians, Dentists, and Professional Nurses. Public Health Service Pub. No. 263, Washington, U.S. Government Printing Office, 1959, 79 pp.

Appendix table 8. Medical schools, schools of basic medical sciences, and colleges of osteopathy in the United States: 1958

State	Name of school	Ownership	Total students	Graduates
4-year schools				
Alabama.....	Medical College of Alabama, Birmingham.....	Pub	289	68
Arkansas.....	University of Arkansas School of Medicine, Little Rock.....	Pub	345	85
California.....	College of Medical Evangelists, Loma Linda, Los Angeles.	Pri	384	96
	University of Southern California School of Medicine, Los Angeles.	Pri	264	60
	Stanford University School of Medicine, San Francisco.	Pri	234	54
	University of California School of Medicine, Los Angeles.	Pub	195	47
	University of California School of Medicine, San Francisco.	Pub	324	83
Colorado.....	University of Colorado School of Medicine, Denver....	Pub	318	79
Connecticut.....	Yale University School of Medicine, New Haven....	Pri	309	72
District of Columbia	Georgetown University School of Medicine, Washington	Pri	407	100
	George Washington University School of Medicine, Washington	Pri	383	90
	Howard University College of Medicine, Washington..	Pri	320	67
Florida.....	University of Miami School of Medicine, Coral Gables.	Pri	265	60
	University of Florida College of Medicine, Gainesville.	Pub	92	.....
Georgia.....	Emory University School of Medicine, Emory University.	Pri	278	66
	Medical College of Georgia, Augusta.....	Pub	386	93
Illinois.....	Chicago Medical School.....	Pri	275	65
	Northwestern University Medical School, Chicago....	Pri	519	131
	Stritch School of Medicine of Loyola University, Chicago.	Pri	337	73
	University of Chicago, The School of Medicine.....	Pri	288	70
	University of Illinois College of Medicine, Chicago....	Pub	677	150
Indiana.....	Indiana University School of Medicine, Bloomington; Indianapolis.	Pub	583	138
Iowa.....	State University of Iowa College of Medicine, Iowa City.	Pub	434	104
Kansas.....	University of Kansas School of Medicine, Lawrence; Kansas City.	Pub	412	107
Kentucky.....	University of Louisville School of Medicine, Louisville.	Pri	382	95
Louisiana.....	Louisiana State University School of Medicine, New Orleans.	Pub	434	95
	Tulane University of Louisiana School of Medicine, New Orleans.	Pri	503	128
Maryland.....	Johns Hopkins University School of Medicine, Baltimore.	Pri	293	75
	University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore.	Pub	355	78
Massachusetts....	Boston University School of Medicine.....	Pri	291	71
	Harvard Medical School, Boston.....	Pri	512	135
	Tufts University School of Medicine, Boston.....	Pri	430	109
Michigan.....	University of Michigan Medical School, Ann Arbor.	Pub	750	160
	Wayne State University College of Medicine, Detroit..	Pub	282	.....

Appendix table 8. Medical schools, schools of basic medical sciences, and colleges of osteopathy in the United States: 1958—Continued

State	Name of school	Owner-ship	Total students	Grad-uates
Texas.....	University of Texas Southwestern Medical School, Dallas.	Pub	388	90
	University of Texas Medical Branch, Galveston.....	Pub	573	151
	Boylor University College of Medicine, Houston.....	Pri	321	78
Utah.....	University of Utah School of Medicine, Salt Lake City..	Pub	207	48
Vermont.....	University of Vermont College of Medicine, Burlington.	Pub	179	38
Virginia.....	University of Virginia School of Medicine, Charlottesville.	Pub	290	66
	Medical College of Virginia, Richmond.....	Pub	357	97
Washington.....	University of Washington School of Medicine, Seattle..	Pub	288	72
Wisconsin.....	University of Wisconsin Medical School, Madison...	Pub	320	76
	Marquette University School of Medicine, Milwaukee..	Pri	393	96
Puerto Rico.....	University of Puerto Rico School of Medicine, San Juan.	Pub	188	45
Schools of basic medical sciences				
New Hampshire..	Dartmouth Medical School, Hanover.....	Pri	48	.....
North Dakota....	University of North Dakota School of Medicine, Grand Forks.	Pub	78	.....
South Dakota....	State University of South Dakota School of Medicine, Vermillion.	Pub	80	.....
West Virginia....	West Virginia University School of Medicine, Morgantown.	Pub	70	.....
Colleges of osteopathy				
California.....	College of Osteopathic Physicians and Surgeons, Los Angeles.	Pri	368	86
Illinois.....	Chicago College of Osteopathy.....	Pri	239	45
Iowa.....	College of Osteopathic Medicine and Surgery, Des Moines.	Pri	241	48
Missouri.....	Kansas City College of Osteopathy and Surgery.....	Pri	381	83
	Kirksville College of Osteopathy and Surgery.....	Pri	339	78
Pennsylvania....	Philadelphia College of Osteopathy.....	Pri	353	97

Source: U.S. Department of Health, Education, and Welfare, Public Health Service, Division of Public Health Manpower Source Book, Section 9, Physicians, Dentists, and Professional Nurses. Public Health Service Publication 263, Washington, U.S. Government Printing Office, 1959, 79 pp.

Appendix table 9. Trend in enrollment, first-year students, and graduates of medical schools and colleges of osteopathy in the United States: 1940-59

Year	MEDICAL SCHOOLS			COLLEGES OF OSTEOPATHY		
	Enrollment	1st-year students	Graduates	Enrollment	1st-year students	Graduates
1940.....	21,271	5,794	5,097	1,692	358	447
1946.....	23,216	6,060	5,826	556	248	213
1950.....	25,103	7,042	5,553	1,778	505	373
1955.....	28,583	7,576	6,977	1,867	487	459
1957.....	29,130	8,014	6,796	1,866	495	442
1958.....	29,473	8,030	6,861	1,921	553	439
1959.....	29,614	8,128	6,895	1,942	516	469

Sources: Turner, Edward L., et al. Medical Education in the United States and Canada. Journal American Medical Association 168: 1459-1547, November 15, 1958. Preliminary data for 1959.

Mills, Lawrence W. Osteopathic Education. Journal American Osteopathic Association 58: 319-332, January 1959 and prior annual reports.

Appendix table 10. Graduates of public and private medical schools in the United States: 1931-58

Year	All schools	Public schools	Private schools
1931.....	4,735	1,658	3,077
1935.....	5,101	1,751	3,350
1940.....	5,097	1,897	3,200
1946.....	5,826	2,143	3,683
1950.....	5,553	2,320	3,233
1955.....	6,977	3,219	3,758
1957.....	6,796	3,134	3,662
1958.....	6,861	3,222	3,639

Source: U.S. Department of Health, Education, and Welfare, Public Health Service, Division of Public Health Methods. Health Manpower Source Book, Section 9, Physicians, Dentists, and Professional Nurses. Public Health Service Pub. No. 263, Washington, U.S. Government Printing Office, 1959, 79 pp.

Appendix table 11. Expenditures for construction of medical schools and their affiliated institutions in the United States: 1948-59
(Millions of dollars)

Type of expenditure	Total	TYPE OF FACILITY			Other institutions used for teaching and research ³
		University owned hospitals ¹	Affiliated hospitals ¹	University educational and research ²	
Total.....	\$1,633.6	\$240.5	\$808.5	\$541.1	\$43.5
Not involving Federal matching funds.....	686.9	112.9	340.6	222.7	10.7
Involving Federal matching funds.....	946.7	127.6	467.9	318.4	32.8
Federal matching funds: Total.....	218.3	34.1	94.0	80.6	9.6
Hospital facilities ⁴	113.1	32.1	72.1	⁵ 2.0	6.9
Research facilities ⁶	85.5	1.0	14.2	68.4	1.9
Cancer and heart research facilities ⁷	19.7	1.0	7.7	10.2	0.8

¹ Classification of hospitals as owned or affiliated was made by each medical school.

² Includes principally basic sciences facilities.

³ Includes many institutions not owned and operated by medical schools such as research centers and health departments.

⁴ Under authority of Public Law 79-725, title VI (the Hospital Survey and Construction Act), which has been extended and amended by subsequent Congresses, funds have been provided for the construction of hospitals, diagnostic or treatment centers, and rehabilitation facilities.

⁵ Includes special bed facilities.

⁶ Under authority of Public Law 84-835, which was extended by Public Law 85-777, funds have been provided for the construction and equipping of facilities for research in the sciences related to health.

⁷ Under authority of Sec. 433(a) and 412(d) of the Public Health Service Act, as amended, funds were made available for cancer and heart research construction during 1948-50.

Source: Unpublished data supplied by the Association of American Medical Colleges.

REFERENCES

Chapter I

- (1) Mayes, H. R. What Does the Doctor Do? Much. What Does the Patient Want? More. *Journal American Medical Association* 167: 1364-1367, July 12, 1958.
- (2) Allman, David B. American Medicine: Its Responsibilities in Planning for Future Needs in Medical Education. *Journal American Medical Association* 167: 23-26, May 3, 1958.
- (3) U.S. Department of Health, Education, and Welfare, Public Health Service, Division of Public Health Methods. Health Manpower Source Book; Section 9, Physicians, Dentists, and Professional Nurses. Public Health Service Pub. No. 263, Washington, U.S. Government Printing Office, 1959, 79 pp.
- (4) Wiggins, Walter S., and Tipner, Anne. Medical Licensure Statistics for 1958. *Journal American Medical Association* 170: 565-610, May 30, 1959.
- (5) Unpublished data from Office of Defense Mobilization.
- (6) Institute of International Education. Open Doors 1958 and Open Doors 1959. New York, The Institute, June 1958, 47 pp. and May 1959, 48 pp.
- (7) U.S. Bureau of the Census. Statistical Abstract of the United States: 1958. Washington, U.S. Government Printing Office, 1958, 1,040 pp. (See p. 5) and Current Population Reports, Population Estimates, Series P-25, Nos. 114, 98, and 187.
- (8) U.S. National Health Survey. Selected Survey Topics, United States, July 1957-June 1958. Health Statistics, Series B-5. Public Health Service Pub. No. 584-B5. Washington, D.C., Public Health Service, November 1958, 49 pp.
- (9) U.S. National Health Survey. Hospitalization, United States, July 1957-June 1958. Health Statistics, Series B 7. Public Health Service Pub. No. 584 B7. Washington, D.C., Public Health Service, December 1958, 40 pp. and unpublished data.
- (10) Collins, Selwyn D. Frequency and Volume of Doctors' Calls Among Males and Females in 9,000 Families, Based on Nation-Wide Periodic Canvasses, 1928-31. Reprint No. 2205, *Public Health Reports* 55: 1977-2020, Nov. 1, 1940. Additional rates computed.
- (11) Unpublished data from U.S. National Health Survey.
- (12) Goldsmith, Selma F. Size Distribution of Personal Income. *Survey Current Business* 38: 10-19, April 1958.
- (13) Committee for Economic Development. Economic Growth in the United States. New York, The Committee, February 1958, 63 pp. Income in 1957 dollars computed.
- (14) Metropolitan Life Insurance Company. Our Rising Educational Level. *Statistical Bulletin* 39: 3-5, August 1958.
- (15) Health Insurance Council. The Extent of Voluntary Health Insurance Coverage in the United States as of December 31, 1957. New York, The Council, 1958, 32 pp. and Greater Security for the American People, Voluntary Health Insurance in the United States as of December 31, 1958. New York, The Council, 1959.

- (16) U.S. Department of Health, Education, and Welfare. Health, Education, and Welfare Trends, 1959 Edition. Washington, D.C., The Department, 1959, 71 pp. (See pp. 30 and 32.)
- (17) Computed from *Journal American Medical Association*, Annual Internship and Residency Numbers.
- (18) American Osteopathic Association. A Statistical Study of the Osteopathic Profession, December 31, 1957. Chicago, The Association, 1958, 33 pp.
- (19) Computed from unpublished data, Health Resources Advisory Committee.
- (20) Computed from data in Guide Issue of *Hospitals* 32: 1-460, Aug. 1, 1958, Part 2.
- (21) Joint Information Service of the American Psychiatric Association and the National Association for Mental Health. Fact Sheet Number 4, December 1957, 7 pp.
- (22) Diehl, Harold S.; West, Margaret D.; and Barclay, Robert W. Medical School Faculties in the National Emergency. *Journal Medical Education* 27: 233-243, July 1952, Part 1.
- (23) The Advancement of Medical Research and Education Through the Department of Health, Education, and Welfare. Final Report of the Secretary's Consultants on Medical Research and Education. Department of Health, Education, and Welfare, Office of the Secretary. Washington, U.S. Government Printing Office, 1958, 82 pp. and Appendix B, processed.
- (24) Unpublished data summarized in U.S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health. A Study of Twenty Medical Schools; A Report to the Director, National Institutes of Health from the Staff Committee on Support for Research and Training. Washington, The Institutes, April 1959, 42 pp.
- (25) Pre-Conference Study Committees on Public Health Training Needs and Resources. Source Book for the National Conference on Public Health Training, July 28-30, 1958. Washington, D.C., U.S. Department of Health, Education, and Welfare, Public Health Service, Division of General Health Services, 1958, 123 pp. and unpublished data prepared for Conference.
- (26) American Medical Association. American Medical Directory, 1958; A Register of Physicians of the United States. Twentieth edition. Chicago, The Association, 1958.
- (27) Dickinson, Frank G. Supply of Physicians' Services. In *Medical Education in the United States and Canada*. Part II. Proceedings of the Annual Congress on Medical Education and Licensure. Chicago, American Medical Association, Feb. 12-13, 1951, pp. 38-42.
- (28) Ciocco, Antonio; Altman, Isidore; and Truan, T. David. Patient Load and Volume of Medical Services. *Public Health Reports* 67: 527-534, June 1952.
- (29) Rusk, Howard A.; Diehl, Harold S.; Barclay, Robert W.; and Kaetzel, Paul K. The Work Week of Physicians in Private Practice. *New England Journal Medicine* 249: 678-681, Oct. 22, 1953.
- (30) U.S. Department of Health, Education, and Welfare, Public Health Service, National Office of Vital Statistics. Natality. *Vital Statistics-Special Reports* 48: 387-406, Oct. 15, 1958, and unpublished data.
- (31) Health Information Foundation. A View of Our Family Physicians. *Progress in Health Services* 7: 1-6, June 1958.
- (32) Unpublished data from Health Insurance Plan of Greater New York and other prepayment groups.

Chapter II

- (1) Association of American Medical Colleges. Annual Applicant Studies in *Journal Medical Education*.
- (2) U.S. Bureau of the Census. Current Population Reports, Population Estimates. Series P-25, Nos. 98, 146, 170, 193. Washington, U.S. Government Printing Office.
- (3) Educational Testing Service. Medical College Admission Test. Bulletin of Information, 1959. Princeton, New Jersey, The Service, [1959].
- (4) Klinger, Eric, and Gee, Helen Hofer. The Study of Applicants, 1957-58. *Journal Medical Education* 34: 424-435, April 1959.
- (5) Datagrams *Journal Medical Education* 34: 681, July 1959.
- (6) Unpublished data supplied by the Association of American Medical Colleges.
- (7) Turner, Edward L., et al. Medical Education in the United States and Canada. *Journal American Medical Association* 168: 1459-1547, Nov. 15, 1958.
- (8) Unpublished data from U.S. Office of Education.
- (9) U.S. Department of Health, Education, and Welfare, Office of Education. Earned Degrees Conferred by Higher Educational Institutions. Washington, U.S. Government Printing Office, Annual publications.
- (10) *Journal American Medical Association*. Annual Education Numbers.
- (11) Association of American Medical College. Study of Financial Problems of Medical Student May 1959. Unpublished data.
- (12) Millett, John D. Financing Higher Education in the United States; The Staff Report of the Commission on Financing Higher Education. New York, Columbia University Press for the Commission on Financing Higher Education, 1952 503 pp.
- (13) Review of current university catalogs.
- (14) Springall, Arthur N., et al. Graduate Medical Education in the United States. *Journal American Medical Association* 168: 521-692, Oct. 4, 1958.
- (15) U.S. Bureau of the Census. Current Population Reports, Consumer Income. Series P-60, No. 30, December 1958. Washington, U.S. Government Printing Office.
- (16) National Science Foundation. Graduate Student Enrollment and Support in American Universities and Colleges, 1954. Washington, U.S. Government Printing Office, 1957, 302 pp.
- (17) Cole, Charles C., Jr. Encouraging Scientific Talent; A Report to the National Science Foundation. [New York], College Entrance Examination Board, 1955, [470 pp.]. See Chapter VI, p. 58.
- (18) American Medical Association. Medical Scholarship and Loan Fund Programs. Chicago, The Association, 1954 [43 pp.].
- (19) Mills, Lawrence W. Osteopathic Education. *Journal American Osteopathic Association* 58: 319-332, January 1959.

Chapter III

- (1) Flexner, Abraham. Medical Education in the United States and Canada; A Report to the Carnegie Foundation for the Advancement of Teaching. New York, The Foundation, 1910, 346 pp.
- (2) Smiley, Dean F. History of the Association of American Medical Colleges, 1876-1956. *Journal Medical Education* 32: 512-525, July 1957.
- (3) McCaughan, Russell C. Osteopathic Education. In *Education for the Professions*, Lloyd E. Blauch, editor. Washington, U.S. Government Printing Office, 1955, pp. 172-177.
- (4) Turner, Edward L., et al. Medical Education in the United States and Canada. *Journal American Medical Association* 168: 1459-1547, Nov. 15, 1958, and unpublished data.
- (5) Council on Medical Education and Hospitals of the American Medical Association and Association of American Medical Colleges. Functions and Structure of a Modern Medical School. *Journal American Medical Association* 164: 58-61, May 4, 1957.
- (6) Council on Medical Education and Hospitals of the American Medical Association and Association of American Medical Colleges. Functions and Structure of a Modern School of Basic Medical Sciences. *Journal American Medical Association* 168: 1096-1100, Oct. 25, 1958.
- (7) Freeborn, Stanley B. The Chancellor's Commencement Address, University of California, Davis, California, June 9, 1959. *University of California Alumni Bulletin*, July 1959.
- (8) Deitrick, John E., and Berson, Robert C. Medical Schools in the United States at Mid-Century. New York, McGraw-Hill Book Co., Inc., 1953, 380 pp.
- (9) Unpublished data summarized in U.S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health. A Study of Twenty Medical Schools; a Report to the Director, National Institutes of Health, from the Staff Committee on Support for Research and Training. Washington, The Institutes, Apr. 1959, 42 pp.
- (10) Diehl, Harold S.; West, Margaret D.; and Barclay, Robert W. Medical School Faculties in the National Emergency. *Journal Medical Education* 27: 233-243, July 1952, Part 1.
- (11) Unpublished data from the American Medical Association.
- (12) Harrell, George T. University of Florida College of Medicine. *Journal Florida Medical Association* 44: 254-260, September 1957 and personal communication.
- (13) Weiskotten, Herman G., et al. Medical Education in the United States, 1934-39. Chicago, American Medical Association, 1940, 259 pp.
- (14) National Library of Medicine. Personal communication, Miss Estelle Brodman; Chief, Reference Division.
- (15) *Journal American Medical Association*. Annual education numbers.
- (16) Springall, Arthur N., et al. Graduate Medical Education in the United States. *Journal American Medical Association* 168: 521-692, Oct. 4, 1958.
- (17) Unpublished study of University of Pennsylvania.

Chapter IV

- (1) Flexner, Abraham. *Medical Education in the United States and Canada; a Report to the Carnegie Foundation for the Advancement of Teaching*. New York, The Foundation, 1910, 346 pp.
- (2) Final Report of the Commission on Medical Education. New York, Office of the Director of the Study, 1932, 560 pp.
- (3) Surgeon General's Committee on Medical School Grants and Finances, Part II. *Financial Status and Needs of Medical Schools*. Public Health Service Pub. No. 54. Washington, U.S. Government Printing Office, 1951, 85 pp.
- (4) Turner, Edward L., et al. *Medical Education in the United States and Canada*. *Journal American Medical Association* 168: 1459-1547, Nov. 15, 1958.
- (5) Graham, Robert W. *Regional Income Distribution in 1957*. *Survey Current Business* 38: 8-23, August 1958.
- (6) Southern Regional Education Board. Personal communication.
- (7) Western Interstate Commission for Higher Education. *Balanced Growth in Western Education; Annual Report 1958*. Boulder, Colorado, The Commission, January 1959.
- (8) New England Board of Higher Education. Personal communication.
- (9) American Medical Association. *AMA News*. Jan. 26, 1959 and February 23, 1959.
- (10) National Fund for Medical Education. *Medical Manpower for Tomorrow*. New York, The Fund, March 1958. (See p. 19).
- (11) Thompson, Morris. Personal Communication, May 21, 1959.
- (12) *New York Times*, February 13, 1959.
- (13) Ford Foundation. *Annual Report for 1956*. New York, The Foundation [1956], 286 pp.
- (14) Commonwealth Fund. *Annual Report, 1956*. New York, The Fund, 61 pp.
- (15) Deitrick, John E. and Berson, Robert C. *Medical Schools in the United States at Mid-Century*. New York, McGraw-Hill Book Co Inc., 1953, 380 pp.
- (16) Carroll, Augustus J. *A Study of Medical College Costs*. Evanston, Illinois, Association of American Medical Colleges, 1958, 188 pp.
- (17) Endicott, Kenneth M. *The Role of Conditional Gifts and Grants in the Medical School of Today*. *Journal Medical Education* 34: September 1959.
- (18) U.S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health. *A Study of Twenty Medical Schools; a Report to the Director, National Institutes of Health, from the Staff Committee on Support for Research and Training*. The Institutes, April 1959, 42 pp.
- (19) *The Advancement of Medical Research and Education Through the Department of Health, Education, and Welfare. Final Report of the Secretary's Consultants on Medical Research and Education*. Department of Health, Education, and Welfare, Office of the Secretary. Washington, U.S. Government Printing Office, 1958, 82 pp.
- (20) Personal communications from National Institutes of Health.
- (21) Darley, Ward. Personal communication Sept. 10, 1959.

Chapter V

- (1) Darley, Ward. Personal communication, Sept. 10, 1959.
- (2) Poor, Russell S., and Maloof, Louis J., editors. Planning Florida's Health Leadership. Medical Center Study Series. 5 volumes. Gainesville, University of Florida Press, 1954 and 1955.

Chapter VI

- (1) Perrott, George St. J.; O'Rourke, John T.; Petry, Lucile; and Weinerman, E. Richard. Education for the Health Services. A Report to the Temporary Commission on the Need for a State University. Albany, Williams Press, Inc., 1948, 170 pp.
- (2) North Carolina Medical Care Commission. The Official Report of the Medical Care Commission on the Expansion of the Medical School of the University of North Carolina. N. Car., The Commission, 1947, 142 pp.
- (3) Poor, Russell S., and Maloof, Louis J., editors. Planning Florida's Health Leadership. Medical Center Study Series. 5 volumes. Gainesville, University of Florida Press, 1954 and 1955.